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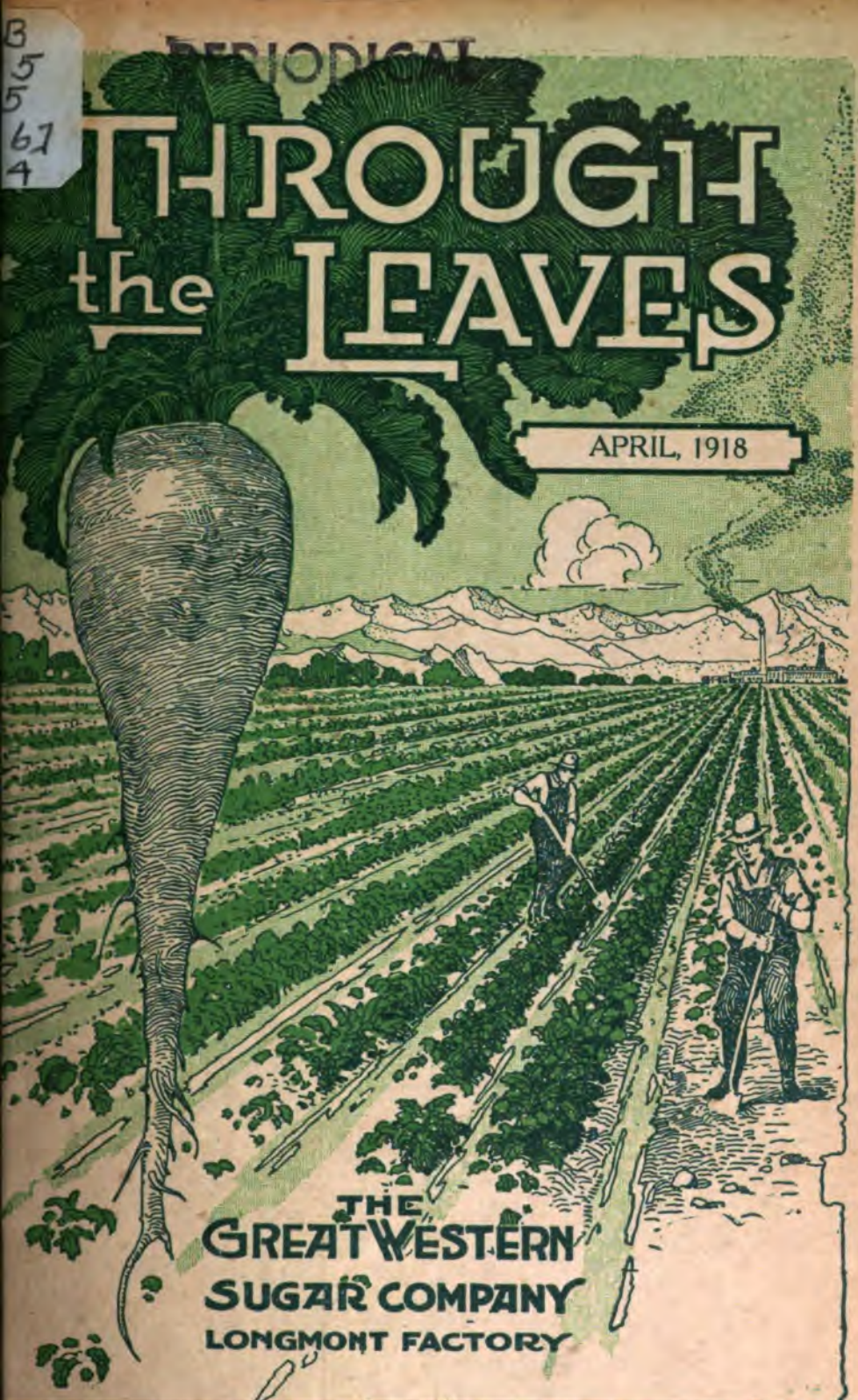
THROUGH the LEAVES

APRIL, 1918



THE GREAT WESTERN SUGAR COMPANY
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THROUGH THE LEAVES

APRIL, 1918

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Buy a Liberty Bond

THE Government must have money to carry on the war. They offer to take our money and guarantee its return with interest. If the required amount is not subscribed, they must raise it some other way, which probably means by taxation. Taxation takes your money but gives you no return value nor interest on your money.

NOTES

N. R. McCreery

BEETS AT $10.00

OW that it has been definitely settled that we will pay $10.00 per ton for beets this year, we hope there will be no delay in getting the beet crop under way. Many have gone right along with their preparations the same as if they had their contracts, and these will be able to get their seed planted early.

\+ + +

In connection with the growing of beets as compared with other crops we have no reason to offer any apology in urging you to grow beets. There is no question about the need for sugar. You may not have personally felt this shortage, but it exists. We are firmly convinced that you cannot afford to farm without a due proportion of sugar beets, and while temporary high prices of other farm commodities may have influenced the present judgment of some to gamble on grain to the exclusion of beets, the level-headed thinking man has figured a little differently. He knows that to date wheat is the only grain product that has a government set price. The price of barley is temporarily high but this may stimulate an increase of barley in grain producing sections to such an extent that next fall it will be a drug on the market. The same is true of corn. The unfavorable weather conditions last fall cut the crop of marketable corn short and temporarily raised the price. It is not likely that the unfavorable weather conditions will follow a second year and the corn crop will be reduced in price by reason of a largely increased supply.

The average wheat crop in northern Colorado last year on irrigated land was near thirty-five bushels per acre. We all know that last year was one of the best wheat years this section ever had and what is more is likely to have again for some time.

The average crop of beets is 12 tons per acre. If you are a landlord which would you prefer, $23.33 per acre as your one-third of the wheat crop with a stack of straw as a by-product, and possibly a hail storm on the side, or $30.00 per acre as your one-fourth of the beet crop and a very valuable by-product in tops valued from $5.00 to $40.00 per acre, depending on the method of their utilization? If you count on 45 bushels of wheat you are also safe in assuming that your tenant is a good enough farmer to produce 16 tons of beets, in which event you would receive $30.00 per acre from your wheat crop and $40.00 for your share of the beets.

Besides, this system of crop rotation makes for better future crops which the one crop system does not.

Last year the average price for beets was $7.62 per ton in the Longmont district. Under the new contract it will be $2.38 per ton more, which would mean the following increase per acre:

10-ton crop	$23.80 per acre
12-ton crop	28.56 per acre
15-ton crop	35.70 per acre
18-ton crop	42.84 per acre

Of course from this will be deducted the $4.00 per acre increase in hand labor. This increase itself represents a very handsome profit.

If you are a tenant you are in reality working for wages. Which do you prefer, a crop that furnishes you work for a long period of time at good wages, or a short job? In all testimony as to cost of growing beets the growers have figured good wages for themselves for all the work they do. This is right and proper, but in figuring the size of your bank account you should not overlook this part of your returns from your beet crop. The size of the pile of money left at the end of the year is what counts, and the beet crop will most certainly make up a big proportion of its bigness.

If you are a tenant you are also probably working with limited capital. Can you afford to take chances that that capital may be taken in a few hours' time by hail?

These are matters for your serious consideration.

SEED BEDS

We have said several times that no amount of after cultivation can make up for a poorly prepared seed bed. The present weather conditions also make it imperative that every effort be made to conserve the moisture that is in the soil. Nearly every one is using the harrow closely behind the plow, but occasionally we find one who does not and it is in the hope of reaching that occasional one that we again mention it.

\+ + +

If you plant on spring-plowed land, make sure you have a firm seed bed. The stand on a large acreage of beets is hurt every year by too deep planting, and most of this is caused by too loose seed beds. A little extra packing will pay well. No doubt many have noticed how the beets come better on the turn row where the ground is firmed by tramping.

\+ + +

Watch your drill. This is something that cannot be emphasized too much. Remember that the seed germ is small. You plant alfalfa seed very shallow. A beet seed germ is very little larger, 1 inch to 1½ inches should be your general practice. Never more than that.

\+ + +

Plant early. Get the plants well started before hot weather and we believe your tonnage will be largely increased.

\+ + +

THE LABOR SUPPLY

There seems to be at this time a great abundance of beet labor and also farm labor, and that this need give no one any uneasiness whatever. We have gone into the matter of price also somewhat and are agreed that in view of the increased price for beets, the labor should receive $25.00 per acre for their work, the additional $1.00 being added to the price for pulling and topping.

In connection with the labor question, we want to call your attention to the housing of these people. The labor situation is not such that you can afford to drive them away by poor living accommodations. It is getting more

and more difficult for us to procure labor for the man with the poor "shack" and when we do succeed it is usually an inferior class of help. It will pay to make your quarters for these people livable.

Pointers for Spring Work on Beet Fields

John Comer

THE most important point to keep in mind is that all spring work should be done early enough so the seed can be planted as early as local experience has shown to be safe.

We have a short growing season anyway in Colorado. The only method by which we can make the growing season longer is to plant early, as we cannot delay the harvesting beyond the time the factory needs the beets. This is particularly important on rich soils if we want to get the full benefit of the fertility of the land.

Feed your horses well a few days before the spring work starts and the horses will be able to do more work from the beginning.

If the soil is rough and cloddy, roll first before plowing. Double disking before plowing is an advantage because it makes a deep mulch. If this mulch is plowed under, you have no air spaces below the surface.

Double disking is not necessary on fall crowned alfalfa land if the crowning has been done well and has already provided a good mulch.

Have the plow in shape so it will scour.

On any but sandy soil the harrow should follow the plow to obtain a fine seed bed. Every day's plowing should be harrowed before night. If it is hot and the wind blows, the ground plowed in the morning should be harrowed before noon.

Harrow two or three times after plowing.

Double disk newly broken alfalfa after plowing.

If the surface still shows clods use a planker.

Immediately after this, level the field with the float at a right angle to the plow furrow, or if the shape of the field is not adapted to this, float diagonally across the plow furrows.

If the seed bed is not packed by rain use a roller.

Shortly before planting harrow again at a right angle to the beet rows.

Look your drill over carefully before you start planting. Do not use worn-out drill shoes.

But if you use new shoes be careful not to plant too deep. If the ground is not packed well, it is also easy to plant too deep. The same drill setting will produce different results on different kinds of soil. Therefore if you change from one field to another, watch carefully the results.

When you back your drill at the beginning of a row be sure that no clods get into the drill shoe.

In order to have the drill shoe adjust itself automatically to uneven ground it is necessary to adjust the keys holding the spring so that the spring has no tension when the drill is out of the ground. If you want more pressure raise the lower key, but do not lower the upper key.

Do not plant on ground which is so wet that the soil sticks to your press wheels.

In fact, all ground should be lightly harrowed after the rain before planting.

Remember that the position of the press wheel determines the depth of planting. Pushing the lever down a few notches merely increases the pressure on the press wheels.

If you want to plant deeper you have to raise your press wheels.

I would rather make the mistake of planting too shallow than too deep. Shallow planted seed will come up quickly after a rain. If you don't get any rain, of course, the deeper planting has a chance to come up. But even then the young plants which have to go through the soil a long time before they see daylight are never as strong as plants which come up quickly.

If you plant early you have a better chance of enough rain to germinate the seed.

The Man and His House

Alfred R. Williams

UST now the various industries of our country, the farming industry among them, are faced with the question of obtaining sufficient labor to enable them to continue production at normal, and in many cases, above normal, rates. For the farmer the labor question is one that often limits his acreage of various crops, and anything that will help him to keep good labor on his farm should be of vital interest.

In assisting farmers to find men for general farm work, aside from the question of beet labor, the writer has been brought up against the fact, that, in several instances the supply of young married men wanting steady work on farms, has been far greater than that of single men. At one time there were registered with the county agent of Boulder county, in his labor exchange, eight married men, some with no children, who wanted work for the full season on farms while there were but three or four single men so registered.

Knowing as we do that as a rule a married man is more dependable as a farm hand than single men, is there not something we can do to make it possible to get the more desirable and dependable class of help? The big factor here is that of living accommodations. A spare room upstairs, maybe a room fitted up in the barn, or a one-room bunk house, is the usual accommodations for the hired man, but these will not do for the young married man unless he leaves his family in town, and pays house rent to keep them there.

It has been the observation of the writer that the few farmers in his district who have a small house built for this class of farm labor have far less trouble in getting through the season with their men than do those who depend entirely on such help as they may be able to get, or

pick up during the busy season. The married man feels more responsibility, he is not in a position to leave on an hour's notice, and is more likely to stay with his employer when a rumor comes along that in another county wages are fifty cents a day higher. He knows that with his little garden patch, a pig or two, and sometimes a cow (for many farmers encourage their men to care for a garden and a few animals) he is better off than if he left his family to stay in town and went off in search for the higher wages.

The Great Western Sugar company in Longmont has recently built two houses on their farm, to serve as living accommodations for men with small families. A short description of these houses, and their cost, will serve the farmer as a basis for estimating the cost of one on his own place.

Both are the same as to size and finish. Each house is 24x36 feet, including porch which is 6x24 feet. There are

four rooms, each 11½x14 feet, inside measurement, all plastered and wainscoted. There is a concrete foundation, the roof and sides painted, the floor and wood work varnished. The cost of one house was $800.00 This could be reduced considerably by building a smaller porch, and by oiling

instead of varnishing the floors and woodwork. The concrete foundation could be built entirely by the farmer, as also could the house itself since it is of simple construction. The accompanying picture will give a good idea of the general appearance.

It is well not to build this sort of a house too close to that of the farm house itself, since it is better for both families not to be too close to each other, especially if there are children.

A more general attention to the comfort and welfare of all our farm labor, our beet workers included, will do much to help solve the question of getting and holding the best class of laborers.

Patriotic Gardens

H. T. Delp

LAST season a great campaign was launched to stimulate interest in growing a garden. The idea was great and the plan worked fine. Great quantities of food were raised on back lots and other places theretofore not used, and our food supply for our boys under the colors was substantially aided by the use of garden stuff at home.

But there is an idea in planning our garden which makes our garden still more patriotic. Our garden stuff should be more of the non-perishable stuff and fruit and vegetables which can be canned. The perishable products in the garden give a temporary relief in the food situation, but does not last all the months of the year. Growing of beans to store and such as corn, tomatoes, peas, green beans and numerous other vegetables to can would make quite an addition to our winter supply of foods.

Then by planning our garden so we will not have an excess of perishable vegetables in the summer time, and have more on hand the year 'round we are planning the highest type of a patriotic garden.

Soil Preparation for Beet Land

Mark Austin

WE are very glad to know that the farmers throughout Utah, Idaho and Washington are signing beet contracts and preparing for a large acreage of beets. The indications are that the acreage will be much larger this year than last, stimulated no doubt by the good price being paid for beets, the great need for sugar, and the fact that the farmers have demonstrated that beet top silage and the by-products of an acre of beets will produce more meat than an acre of alfalfa hay.

We want to congratulate the farmers for getting most of their land fall plowed, possibly more than ever before. So that the farmers may get the benefit of this important work, would like to urge upon them to get their harrows and levellers in shape at once, so that as soon as the weather and soil conditions are right (before it gets too dry) they can harrow and level their land and make a fine, dust mulch on top so the moisture will be retained near the surface to bring up the seed after planting. It would be a great shame and loss if the land were allowed to get too dry before it is worked. Where the soil dries unevenly, it will be found profitable to work the land in small patches as fast as it gets dry enough, because if the work is left until the whole field gets dry enough to work, possibly some parts will become too dry. My opinion is there is nothing as important in beet growing as that of being careful to see that the moisture does not escape from the soil.

There is no reason why the farmers should not get a good stand of beets on every acre of land, if the proper care is taken in regard to its preparation. I think there is more money lost by the farmers by carelessness in the working

of their soil, in the spring, thereby, in losing the moisture, than any other one thing.

The soil throughout Utah and Idaho this year is in excellent condition for moisture; if it is too early to plant, and the soil is worked down to a perfect seed bed as fast as dry enough, it will hold the moisture, until the time of planting arrives in most cases. Of course, if the planting is not done the weeds get sprouted, the soil could be reworked to kill the weeds before it is planted. The soil is not likely to be over-worked, but very often is not worked enough. The report is that we have an abundance of snow in the mountains and prospects for water are very good. We may have an early spring so that we can start to work early, therefore we should prepare at once and have everything in readiness so there will not be a minute lost when the time comes to go to work. Many of our farmers neglect their tools and do not get them in shape until they get ready to use them, then several days are lost, besides a great deal of money.

Want to emphasize again, where the farmers have land that is to be spring plowed, the advisability of harrowing and leveling it, just as soon as it is dry enough. It will plow better, and the fine, damp soil will go to the bottom of the furrow; the seed bed will be better prepared and the crop will grow better because the roots of the beets can work better in fine soil than in cloddy soil and it will hold the moisture much longer both before and after plowing, if the harrowing and leveling is done, just as soon as it is dry enough. This is one of the most important things in connection with farming and should be followed by every farmer. You can generally harrow and level the ground if you get ready, before it is dry enough to plow; of course you would not want to go in on the land when it is wet. Great care should be exercised in regard to that matter. Land spring plowed should be harrowed and leveled as fast as plowed, and a good seed bed made at once while the land is damp, before it gets too dry, otherwise a poor stand of beets will be the result.

Early preparation of seed bed means early planting, early planting, nine times out of ten, when other conditions are equal, means larger tonnage. Earlier planting means earlier maturing and earlier maturing means earlier harvesting. Earlier planting means earlier thinning, when this work can be done early it is very important because it can be done before other work becomes pressing, such as haying.

There is an advantage to those who can get ready early to thin their beets, because there is always plenty of labor for the early work.

Sincerely hope the farmers will have a bumper beet crop this year, because we had a rather light crop last year and generally a heavy crop follows a light one; this has been our experience in the past, especially when he have had such a splendid winter.---The Utah Farmer.

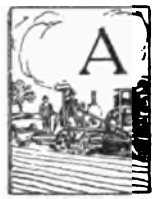
Meteorological Report

FOR FEBRUARY 1918 AND 1917

Temperatures	1918	1917
Mean Maximum	50.50°	47.7°
Mean Minimum	16.37°	16.7°
Monthly Mean	33.44°	32.2°
Departure from Normal	+5.44°	+4.5°
Maximum	72.00° on 22nd	68.0° on 23rd
Minimum	—6.00° on 27th	0° on 8th
Precipitation in Inches:		
To Date	1.55	0.69
For Month	1.21	0.50
Greatest in 24 hours	0.52 on 27th	0.21 on 17th
Departure from Normal	+0.53	—0.46
Number of Days:		
Clear	12	13
Partly cloudy	14	6
Cloudy	2	9

Liberty Bonds

Rae H. Kiteley



APRIL 6, 1918 has been set as the opening date for the third campaign of the United States government to sell bonds to its citizens. This date has been chosen because it is the anniversary of our declaration of war. The amount of the bonds to be offered and their rate of interest have not been announced, as this is written, but doubtless the issue will be in excess of $3,666,000,000 authorized by congress but unissued. Legislation is being asked which will probably affect both the size of the new offering and the interest.

Farmers as a class have been much criticised for not buying bonds in as full measure as those in other walks of life. There are many good reasons for this condition and some of them should be removed at this time. The farmer, as a rule, uses his capital to buy and improve his land, his livestock and his equipment and is in the habit of receiving his return on his investment through his crops and his livestock increase. When these returns have accumulated in sufficient amount he is apt to add to his land holdings, loan on farm mortgage or retire and live on the income from his farms. His habits of life and business have never accustomed him to study or make investments that produce interest payments on fixed dates annually, semi-annually, or quarterly. The quality of security is easily ascertained by him if it be a first mortgage on farm land with which he is acquainted, so he does not study the intricacies underlying bond issues.

Under the stress of the greatest war in history, so great that a "counterpart of the four-year struggle between the North and South is reproduced every fifty days," it is incumbent upon everyone to change his customary attitude toward many things, and the distance by which voluntary change forestalls necessity will determine in a large degree the length of this war.

The people of Longmont and vicinity have not hesitated

to give their money to various war activities in double their proportionate share but they have been remiss as to bond buying. It may be argued that to give money is more honorable than to simply invest in a gilt-edge security which insures not only the return of the money but a semi- annual payment for its use and in all probability a premium on the face of the bond as soon as the war is over. The story is told of a man who wrote to Washington asking the date on which he would be expected to pay the interest on the bonds he had purchased. Evidently he had been used to paying instead of receiving interest and he may be still more surprised to find after the war that he can sell those same bonds for much more than he paid for them.

U. S. bonds have jumped above par heretofore, as soon as normal conditions were restored, and doubtless will again, unless our present enviable position is changed. Our bonded indebtedness is now only one-fourth of 1 per cent of our national wealth while the ratio of our allies is 14 per cent and of the central powers 28 per cent. If we float bonds to the extent of 72 billions of dollars, five times as much as now contemplated, we shall still be in a better position than after the Civil War and that debt was cared for in fifteen years with ease.

Every home should have one or more Third Loan bonds. Farming communities such as ours, are being watched very carefully, property holdings, incomes, auto ownership, etc., are being checked up and the drive will bring our duty home to some of us, rather uncomfortably if we do not rise in similar manner to our Red Cross and like subscriptions. Our paramount duty is to supply the sinews of war from our savings. If we do not provide the funds willingly by investing in bonds we shall be taxed. The latter method will give us no return of the money in the future and will cast an undue burden on the present generation, and its industries essential to carrying on the war. Let us study this situation and so act that when the Third Loan is closed our investing record shall correspond with our giving record.

Eggs and Their Cost

Adapted for "Through the Leaves"
Mrs. Frank Wadsworth

EVERYWHERE you hear the assertion that eggs are too high and there is no reason why such should be the case. Let us present a few facts for your consideration in the hope that you will have a more correct idea of actual conditions:

Comparing poultry raising with other industries, we will call feed our raw material, the flock our machinery, the eggs our product. When the raw material of a shoe factory advances 60 per cent the general public takes an advance of 60 per cent in the price of shoes as a matter of course.

When the raw material of an overall factory advances 75 per cent the general public takes an advance of 75 per cent in the price of overalls as a matter of course.

When the raw material of a farmer's egg factory advances 375 per cent that same general public will denounce a 25 per cent advance in the price of eggs as an outrage.

The farmer must deliver his wheat to the market place, we will say an average of three miles, and sell it for from $3.20 to $3.35 per cwt. Then he pays the mill $3.00 per cwt. for screenings which do not contain as much nutrition as the wheat and hauls the same home. If you add to the cost of the screenings, the cost of labor of man and team, you have paid more for inferior feed than you have received for your good wheat and the raw material has advanced 400 per cent.

Poultry raisers are subject to the same economic laws as other industries and if cost of production advances the finished product must carry an approximate increase.

The poultry business is peculiar in that at some seasons the profits seem large and at other seasons the losses are

just as large. You may have a flock of 300 hens and get 200 eggs a day in the spring and only 10 eggs a day in the fall, BUT the feed bill shows very little variation.

You have to figure from January 1st, to December 31st. to find out how you stand financially.

The government has regulated the price of wheat and at the same time has forbidden the farmer to use it for chicken feed, while on the substitute feed he must use, the only price limit seems to be the sky. The public is paying much higher prices for everything else and why they should demand cheap eggs is hard to explain.

Do not ask the farmer to sell eggs with a less per cent profit than you would ask or expect from other lines of trade. Just give them a fair deal.

To Prevent Soil from Blowing

From "Berthoud Bulletin"

Paul Mead tells us that he has successfully prevented the west wind from blowing the soil on a piece of bean ground where fall-sown crops had blown out for four years in succession, by plowing furrows north and south about twelve feet apart.

The ground is as fine as powder, but the slight ridge lifts the wind above the ground so that the soil does not blow.

Reprint from the Proceedings of the American Farm Management Association, December, 1917.

The Food Supply

G. F. Warren

THE PRESENT FOOD SUPPLY

WHEAT on Hand---Statistics given out by the government indicate the present wheat situation to be as given in Table 1. There seems to be enough wheat, but it is too far away. There is a shortage of about 350 million bushels for our allies and ourselves. The thing to do and the thing that the Food Administration promises to do is to see that our allies get enough wheat to keep up their fighting spirits. We can eat something else. After we have eaten our share, which we are eating much too rapidly, there will doubtless be pressure to have wheat held for us. When that time comes, there should be a stronger pressure to see that our allies get all the wheat they need.

The estimated surplus of 540 million bushels in countries too far away to make shipment has been cited as evidence that if the war should stop, the price of wheat would drop below the price now fixed by the government. There are millions of Poles, Belgians, Armenians, Turks, Austrians and Germans who will need wheat when the war closes. Because of this great demand, there will, then, be a greater shortage of food in America than now exists.

Winter Wheat Planted---The comparative acreages of winter wheat and rye planted in different years are given in Table 2. This year there is a marked increase in rye, but only a small increase in wheat. The present wheat acreage is about the same as in 1914. The 1914 crop was planted without "advice" or "campaigns" or fixed prices. It was planted in anticipation of war prices that did not materialize until last year. The reason why prices did not

Table 1. Millions of Bushels of Wheat

France—Italy—United Kingdom—Belgium:		
Average imports wheat 3 years before war	381	
Average production	591	
Total used	972	
Production 1917	394	
Short	578	
Estimated export surplus:		
United States	80	
Canada	150	
		230
Australia on hand	120	
Australia new crop	120	
India on hand	50	
India new crop	70	
Argentina new crop	180	
		540

Table 2. Thousands of Acres Planted to Winter Wheat and to Rye.

Year Planted	Winter Wheat	Rye
1908[1]	29,301	2,324
1909[1]	31,656	2,413
1910[1]	32,648	2,415
1911[2]	33,215	2,478
1912[2]	33,618	2,731
1913[4]	37,128	2,773
1914[5]	42,012	3,153
1915[6]	39,203	3,474
1916[7]	40,534	4,480
1917[7]	42,170	6,119

[1]U. S. Dept. of Agri.—The Crop Reporter, December, 1911, p. 90
[2]U. S. Dept. of Agri.—The Crop Reporter, December, 1912, p. 96
[3]U. S. Dept. of Agri.—Farmers' Bulletin 570, p. 35.
[4]U. S. Dept. of Agri.—Farmers' Bulletin 645, p. 37.
[5]U. S. Dept. of Agri.—Monthly Crop Report, December 1915, p. 84.
[6]U. S. Dept. of Agri.—Monthly Crop Report, December 1916, p. 122.
[7]U. S. Dept. of Agri.—Monthly Crop Report, December 1917, p. 134.

rise in 1915 is shown in Table 6. Had the prices of wheat not been regulated, the area planted this fall would probably have been much more. The acreage of winter wheat recommended for this fall by the United States Department of Agriculture was 47,337,000 and the rye acreage 5,131,000. The rye acreage is greater than that recommended by nearly one-fifth, but the acreage of wheat with its fixed prices is about the same as that of 1914.

The Corn Crop---This year's corn crop is estimated at 3,159 million bushels. The average for the preceding five years is estimated at 2,754 million bushels, but this year's crop includes a large amount of badly damaged corn. At the time when killed by frosts 18 per cent was in the dough stage as compared with 4 per cent in a usual year, 11 per cent was in the milk stage or earlier compared with 1 per cent in a usual year*. Probably that in the dough stage is included in the estimated yield, but it is probable that farmers did not include that in the milk stage in their estimates of yield. Considering the inflated currency and the large amount of soft corn, it is to be expected that corn will sell for much more than the present prices of new corn.

Animals---The approximate efficiency of different animals as producers of human food is shown in Table 3. Dairy cattle are by far the most efficient animals for converting vegetable matter into animal food. Hogs and poultry are efficient, but they use a very high class of food that a cow could also get more out of. Cows also furnish hides.

Table 3. Proportion of Food Eaten Returned for Human Use.[1]

	Per cent of protein returned		Per cent of energy returned		
	Of total food	Of digestible protein	total food	Of digestible food	Of production value of food
Dairy herds	14.5	22.9	10.0	15.1	33.8
Steer	6.4	11.8	4.7	6.9	14.8
Poultry flock	14.5	18.6	6.4	7.5	12.6
Hog	10.2	13.2	15.1	17.5	29.9

[1]Eckles and Warren, Dairy Farming, p. 8.

*U. S. Dept. of Agri.—Monthly Crop Report, November, 1917, pp. 105, 110.

The results for hogs are estimates. The results for both hogs and steers are too high as no allowance is made for deaths and for maintenance of breeding stock. Accurate comparisons require that the feed for the entire industry be compared with the returns of the entire industry. Comparisons for mature animals alone are not sufficient.

The relation of population to animals before the war is shown in Table 4. When population becomes very dense, men are forced to become the beasts of burden. They are then willing to do the work of a horse to get the horse's food.

Table 4. Relation of Population to Animals.[1]
Livestock per 100 Persons

	Animal units of cattle, reindeer, sheep, goats, hogs.	Horses, mules asses
Argentine	443	135
Australia	395	43
Canada	82	36
United States, 1850	92	
" " 1860	89	
" " 1870	67	
" " 1880	87	
" " 1890	93	
" " 1900	73	
" " 1910	69	30
Rumania	38	11
France	37	10
Netherlands	33	6
Denmark	33	20
Germany	31	7
Russia	29	20
British Isles	29	4
Belgium	23	4
Japan	2	2
Iowa	219	75

[1]An animal unit is one head of grown cattle, or equivalent in other stock. For the United States from 1850 to 1900 the figures are a little low as some young animals are omitted.

The changes in numbers of livestock in various countries since the war began are given in Table 5. The number before the war is compared with the latest figures published by the International Institute of Agriculture. Livestock has decidedly decreased in some countries since these figures were obtained.

Table 5. Changes in Numbers of Livestock Since the Beginning of the War

	Percentage Increase or Decrease				
	Cattle	Sheep	Hogs	Poultry	Horses
Germany	— 3	— 8	—33		+ 4
France	—16	—34	—40		—29
Great Britain	+ 5	+ 3	—12		+21
Denmark	0	— 7	—34	—19	+ 1
Norway	— 2	— 3	— 3		+ 4
Netherlands	+10	—38	—12		
Canada	— 1	— 2	—27		+ 3
United States	+12	— 2	+14	— 1	+ 1
U. S. Civil War Period, 1860-70	— 7	+27	—25		+14

The results of this war agree well with the effects of the Civil War except in the case of sheep. In that war the impossibility of getting cotton made sheep increase. The hogs and poultry that consume food fit for human use are decreasing most. A limited number of hogs and poultry can be kept as scavengers, but larger numbers consume grains fit for human use. When men are hungry enough, they prefer 7 pounds of corn to one pound of dressed pork. There may be some question whether it is desirable for America to materially increase its hogs or poultry since such an increase comes out of the grain supply. One advantage in increasing hogs now is that it will mean the holding over of corn in the form of pork. If we are not to hold it over as corn, it is certainly well to have it held in some form. Probably it is best to make every effort to keep up the supply of livestock. It will decrease rapidly enough in spite of all efforts. Livestock always tends to decrease in times of food shortage.

THE OUTLOOK FOR NEXT YEAR

What Crops May be Expected—Weather and labor are the great factors in crop production and, of these, weather is the dominating one. How variable the seasons are in America is shown in Table 6. On the basis of average yields the area planted for 1915 should have given 838 million bushels of wheat. It did give 1026. The production in 1917 was 20 per cent less than that expected from the area planted. Nearly all of our land is subject to se-

Table 6. Wheat in the United States
All figures are Millions

Crop Year	Acres planted	Acres harvested	Expected production from acreage planted	Raised
1910-14	53	49	——	728
1915	61	60	838	1026
1916	57	53	783	640
1917	60	46	824	651

vere droughts. In times of peace this was not realized because a drought merely meant decreased exports or possible imports.

Average Yield Per Acre—The average yield per acre in pounds of grain calculated from estimates of the Department of Agriculture are given in Table 7.

Table 7. Pounds of Grain Per Acre

Total pounds of corn, oats, wheat, barley, rye, and buckwheat divided by total acres of these crops in the United States from Yearbooks of the U. S. Department of Agriculture.

Year	Pounds per acre	Year	Pounds per acre	Year	Pounds per acre
1866	1120	1878	1191	1898	1157
1867	1050	1879	1263	1899	1138
1868	1134	1880	1188	1900	1135
1869	1112	1881	866	1901	913
1870	1241	1882	1114	1902	1260
1871	1233	1883	1032	1903	1143
1872	1280	1884	1138	1904	1215
1873	1086	1885	1138	1905	1310
1874	957	1886	1025	1906	1358
1875	1221	1887	948	1907	1167
1876	1097	1888	1121	1908	1181
1877	1217	1889	1184	1909	1221
Average		1890	920	1910	1256
12 years	1146	1891	1231	1911	1074
		1892	1046	1912	1380
		1893	1002	1913	1122
		1894	934	1914	1222
		1895	1209	1915	1342
		1896	1221	1916	1109
		1897	1105	1917	1259
		Average		Average	
		20 years	1094	20 years	1198

Judging by the past 20 years there is one chance in 20 that next year's yield per acre will be less than three-quarters of this year's. In that event a large part of the live-

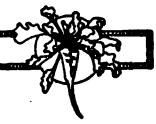
stock would have to be eaten. There are ten chances in 20 that the yield will be more than six per cent below this year's production, and only five chances in twenty that the yield will be as good as this year. Or, the chances are four to one against a crop as good as this year's and one to one of a crop more than six per cent below this year's.

A yield per acre of 10 per cent below this year's production is so common that we should make plans for a year at least this unfavorable. In other words, if we desire reasonable assurance of being able to live as well next year as this year and at the same time export as much as this year, plans should be made to do man's part for a total production of 10 per cent more than was planted last year. Considering the present condition of the winter wheat, even this is taking enough risk.

Total Production of Grain---The total production of the six grains in pounds is given in Table 8. The crop of 1915 was the largest ever produced and 1917 was the next largest.

Table 8. Total Pounds of Corn, Oats, Wheat, Barley, Rye and Buckwheat Produced in the United States

Year	Billions of Pounds
1898	176
1899	180
1900.	180
1901	161
1902	222
1903	198
1904	209
1905	233
1906	250
1907	217
1908	226
1909	243
1910	249
1911	219
1912	278
1913	230
1914	252
1915	294
1916	235
1917	281



Grain Reserves---A large amount of the 1915 crop was held over by farmers and was used to supplement the 1916 crop, otherwise the food problem last year would have been a very serious problem rather than merely an occasion for light oratory. On March 1st, 1916, there were 99 billion pounds of grain on farms, the third largest hold-over that there has ever been, but on March 1st, 1917, there were only 64 billion pounds, the lowest hold-over in 15 years. The grain that had left the farmers' hands, "visible supply," was also greatly reduced.

Table 9. Grain on Farms in the United States. March 1st.[1]

	Millions of Bushels				Total millions
	Corn	Wheat	Oats	Barley	of pounds
1898	983	121	272		59,815
1899	801	198	283		65,776
1900	774	159	291		62,164
1901	776	128	293		60,521
1902	441	173	226		42,349
1903	1,051	164	365		80,357
1904	839	133	274		63,702
1905	954	111	347		71,212
1906	1,108	158	380		83,726
1907	1,298	207	384		97,388
1908	962	149	267		71,379
1909	1,048	144	279		76,219
1910	978	159	365	42	78,010
1911	1,165	163	443	33	90,797
1912	884	122	290	25	67,297
1913	1,290	156	604	62	103,934
1914	866	152	419	44	73,168
1915	911	153	379	43	74,383
1916	1,117	244	598	58	99,133
1917	789	101	394	33	64,473

[1]U. S. Dept. of Agr.—Yearbook, 1916, pp. 564, 574, 584. Monthly Crop Report, March, 1911, p. 17; March, 1913, p. 17; March, 1916, p. 21; March, 1917, p. 21.

The total grain disposed of in the year ending March 1, 1917, is given in Table 10. The reserve supplies of grain were reduced by 36 billion pounds. The consumption and exports exceeded the production by this amount. This is one pound a day for each person in the United States. The grain disposed of was greater than the production has ever

been except in 1912, 1915 and 1917. In 10 of the last 20 years the production has been less than 84 per cent of the amount disposed of in the year ending March 1, 1917. Last year was considered a very bad year, but what would

Table 10. Grain Disposed of in the Year Ending March 1, 1917.

	Billions of Pounds	
On farms March 1, 1916	99	
Visible supply, March 4, 1916[1]	7	
Grown in 1916	235	
Total		341
On farms, March 1, 1917	64	
Visible supply, March 3, 1917[1]	6	
Total		70
Total disposed of		271

[1]Bradstreets, March 10, 1917, p. 168.

such a year mean had it not been for the reserves that were consumed? Not only was the consumption of grain more than can be expected of next year's crop, but much of the hog and poultry breeding stock was consumed.

Last spring the wheat reserve on farms was reduced to the lowest point in 20 years. The corn reserve on farms was the lowest in 15 years. All last year when there was so much discussion about hoarding, farmers were selling their crops and animals too rapidly. It is of the utmost importance that the grain reserve held by farmers be brought back to normal, or better, this year. Such a low reserve as was held over last year, together with an unfavorable year, would mean famine. Unfortunately, the city point of view now dominates, and the city wants to eat all the food as soon as it is grown, if not sooner. It has no sympathy with an industry that is as slow as nature's process. Joseph saved for seven years and saved a nation, but there were no city newspapers to tell him when to sell. The farmers who hold over some of this year's corn and oat crop may save more than one nation. It is desirable that considerable of this year's wheat crop be held on farms

till the new wheat crop is assured. We would like to eat it all today, but we may really need it later.

The Present Labor Supply—In 1910 there were in the United States 12,285,579 persons over 10 years of age engaged in agriculture. Of these, nine and a half million were males over 15 years old. Less than half of the farms had any hired help. The average amount expended for labor was $102 per farm. This indicates that there was less than one hired man for each two farms. Many of the persons engaged in agriculture were too old or too young to do full work. The younger ones are in school part of the year. Some others are not strong enough to do a man's work. Probably nine million men such as the farm boys who are taken for the army would do more work than all the persons engaged in agriculture. This would be equivalent to one and one-half such men per farm. On April 21, 1917, the number of hired men on New York farms was 15 per cent less than a year before. Many sons had also left the farms to go to factories or to the army. An estimate of 10 per cent of the man power on American farms has gone to the factories or to the army or navy is conservative. It may be much too low.

Patriotism and Production—The only way to get increased crops is to plow and plant, and fight the weeds and weather. Patriotism helps a soldier to fight, but he needs ammunition also. He is a very ineffective soldier unless he has both. Patriotism helps a farmer to raise crops, but he needs other things also. Too much dependence is being placed on patriotism, exhortation and scolding. Farmers are responding to the patriotic appeal so far as they can with the family labor, but in order to hold hired labor they must be able to pay wages that will compete with the factories that make talking machines, moving pictures, candy, gum, and beer. When a farmer borrows at the bank, the banker does his patriotic duty if he requires some assurance that the money intrusted to the bank will be returned if lent. Such assurance is not easy to give if the

wages that the farmer must pay are out of proportion to the price he gets.

One-third of the farmers are tenants and have little to give their country except children and labor. They can not sell crops grown with hired labor for less than they cost because they have no capital to lose. In 1910 only 36 per cent of the farmers owned all the land that they operated and were free from mortgage. This explains the small sales of bonds to farmers. Relatively few farmers can make any outside investments and continue to farm effectively.

Business Confidence—Business confidence plays a large part in production. The fact that there are more voters in the city than in the country, and that they are now proposing to decide what price the farmer is entitled to get, together with the mass of amateur advice that fills the daily papers, some of which is given out, or purports to be given out by the government, is undermining the confidence of farmers. It is always disconcerting to produce for a single buyer, whether it be for a corporation or for a government, because there is such great uncertainty as to what mood the buyer will be in. Prices fixed by committee action are too likely to be a matter of accident as to who is on the committee. The indictments and innumerable investigations of the dairy industry, the largest and most universal farm industry, as well as the general price agitation are resulting in a class feeling among farmers that has formerly been absent from, or has played a very small part in, American agriculture. The results of such agitation are always unfortunate, but are particularly unfortunate at this time. If they continue, there is danger that much of the farm effort that should be devoted to production will be diverted to the formation of protective associations. At the present time some farmers are angry; some are bewildered; but the majority feel uncertain. Morale is important on farms as well as in the army. Last year the response of farmers was remarkable. Strong efforts need to be put forth to remove the effect of the agita-

tion of the past fall and winter, if the farmers are to enter next year with the same vim that they had last year.

SOME PROPOSED REMEDIES

Price Control---One of the important problems of the war is whether to attempt to arbitrarily keep down prices and wages in spite of an inflated currency, or let the cheaper dollar do part service by letting prices and wages rise. Thus far the public agitation has been in the direction of price control. The public seems to have decided to repeal the law of supply and demand. Unfortunately, the repeal applies to supply as well as demand. Some persons believe that since we are at war, the law of supply and demand fails to operate. It would be as logical to say that a heavy weight repeals the law of gravitation. We should not make the mistake of assuming that man can repeal either law.

When the consumer is in power the goose that lays the golden egg is in danger. We have regulated our railroads for the past decade so completely to the satisfaction of the public, that the investor has put his money elsewhere. We are now beginning the same experiment with farming. Much of the agitation for price control fails to distinguish between large corporations that are more or less monopolistic, and farming that is made up of millions of small independent units.

The motives for price control are numerous. Business interests want food regulated so that wages will not rise. In effect this means that the farmer's wage is to be reduced so that city wages need not rise. The employer who hopes for cheaper food is in a mood to cause industrial disturbances. The vain hope that food can be made cheap when the supply is decreasing and when its price is measured by a shrinking dollar, leads employers to delay giving inevitable wage increases and thus favors industrial disturbances. Wage demands that may be high at the moment may be amply justified in the near future because of the further decrease in the purchasing power of money. The employ-

er who faces the facts squarely is the one who is in a mood to meet the situation wisely.

Social workers want food prices reduced to help the poor. This means that the country is to carry the cities' charities, in addition to its own county poor farms. If there is any inequality in the distribution of wealth, it is not because there is too much money in the country. The inequality should be made up by adjustment within the city rather than by trying to take it out of the farmer.

The ordinary consumer thinks of price control as a chance to have more. It makes a shortage look like plenty. For ages cheapness and abundance have been synonymous. The public has not worried itself about which was the cause and which effect. It has therefore, been all too easy to fall into the error of assuming that control of price will make food cheap, and therefore, abundant. When asked why low prices will be a benefit, nearly everyone replies, "so that we can have more to eat." The writer has tested this point of view with many professional and business men by asking questions somewhat as follows: "If the government lowered the price of potatoes last winter, would you have eaten more of them?" The answer is usually "yes." "Would your neighbors have eaten more?" The answer is always "yes." "But, could we have eaten more potatoes than there were?" To a very considerable extent the agitation for low prices is a protest against having to economize.

Others wish price control because they fear riots in cities. The trouble with this point of view is that reduced prices may result in a real shortage that will be more serious than high prices. When there is a real shortage, complaints about price stop. No one now complains about prices of coal or sugar.

Much of the agitation for price control is anarchistic in its effect—attempting to array class against class. We are told that farmers are unpatriotic hoarders; that retailers are profiteering; that middlemen are altogether bad; and that labor is unpatriotic. The merchant who charges

me double the former prices for hardware is not getting unduly rich and the retailer whose high-priced groceries I consume has his troubles. One class is as patriotic as another. Of course, there are dishonest men in every industry. One of the twelve Disciples did some profiteering but that is no reason for attacking the other eleven. The search for the culprit could easily end if we would but realize that war makes its own prices. The agitation for price control has resulted in a deep seated belief that prices are high because some one is profiteering. This agitation is sowing the seed for riots.

Many of the food plans advanced are copies of what was done in Europe---plans that resulted in a food shortage there. Europe was justified in its procedure, since it could call on America for food. If we pattern our work after Europe, we, too, will as surely have a food shortage, but where will we go to get food? If we keep up our production, we will have to study America rather than Europe. The Iowa farmer produces about four times as much food per man as does the farmer in Belgium. Before the war the yield per acre (crop index) in the United Kingdom was 64 per cent above ours, but the production per man was only 43 per cent of ours. The crop index in Germany was 55 per cent above ours, but the yield per man was only 41 per cent of ours. The crop index in Belgium was 105 per cent better than ours, but the production per man was only 40 per cent of ours. The hand labor methods of Europe make it possible to use women and to use unskilled labor to better advantage. American machinery and American methods demand more skilled labor and require a larger proportion of men than are necessary in Europe, and most of American farming requires three or more years of apprenticeship.

Not only do low prices tend to reduce production but they tend to reduce the present supply. If prices of corn and feed are fixed, the horses will be fed more liberally and there will be less feed for other classes of livestock.

The objections to price control are not based on a desire

to have farmers make more. The more price control we have the fewer farmers there will be and ultimately the more money those who are left will make. The objection to price control is that it stimulates consumption and reduces production.

There is every expectation that America will be called on for much larger exports next year. Our primary problem is production; price is secondary. So far as agitation for reduced prices is successful, it reduces production and defeats its own aim. The consumer thinks of price as applying to this year, but this year's price is the farmer's guide for next year's production.

We need to prevent all waste of food, to mend our old clothes, wear patched shoes, and reduce the manufacture and use of all luxuries, if our allies are to be fed and clothed. We must, if possible, maintain or increase food production. Nothing will so readily accomplish all these things as good prices, and nothing will make it so difficult to accomplish any one of them as low prices. The solution of the food problem is more food; not less price.

If further price control is to be attempted it should be done in a symmetrical manner. Every price regulation should be accompanied by effective measures to regulate consumption and maintain production.

We are eating our present wheat crop too fast. Had prices been allowed to take their own course, the farmer would be getting much more for his wheat, and the higher price of flour would have limited consumption. The high price of wheat would have caused a very large planting. Having upset the natural course of events, two more regulations were necessary, one to encourage planting and one to prevent consumption.

To encourage planting, a minimum price was promised to the farmers. It is probable that this resulted in planting a smaller area than would have been planted had no regulation been attempted.

To discourage the large consumption that naturally follows a low price, we are depending on voluntary action by

the consumer. Much has been accomplished, but it is very doubtful whether this alone will lead us to save enough wheat for next summer's use. Thus far the great obstacle in the way of success has been the abnormally low price of wheat compared with other products. Fixed prices need to be accompanied by rationing.

It is difficult to convince the public of the necessity of saving when prices do not indicate such a necessity. The fixing of the price of wheat at less than it was worth made it cheaper than corn in many regions. In New York it has been 40 to 50 cents a bushel cheaper than corn. This not only tended to increase human consumption, but resulted in having more than the usual amount of wheat fed to livestock.

If prices are to be controlled they should be kept in adjustment with each other, else the types of farming will be shifted. So few persons have studied the economics of farming that few realize that farming is the most highly standardized industry. How skillfully farmers have adapted their practices to their conditions is illustrated by corn and hog production in Iowa and in Illinois. These two states produce about the same amount of corn but the corn is worth about 2 to 4 cents a bushel less in Iowa. The hog industry is so sensitive to the price of corn that Iowa has twice as many hogs as Illinois.*

If prices are to be fixed then there should be forced loans and fixed prices for, and a guaranteed supply of machinery and fertilizers. The acreage planted must be controlled, the feed for horses regulated, and all the population will need to be conscripted to compel labor to go to unprofitable but necessary industries. Every regulation necessitates a dozen more.

The cost of production is more nearly constant per acre than it is per bushel, hence prices set in advance on a bushel basis are likely to be good in a good year when high prices are not necessary, and low in a poor year.

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* Warren, G. F., Farm Management, p. 55.

Prices fixed on the average cost are below the cost for about half of the farms. Such prices will decrease production. If greater production is to be obtained the marginal land must be used and the marginal last bushel obtained. This increased production is not obtained at average cost but at very high cost.

Fallacious cost figures are all but universal. Of the entire area of winter wheat planted last year 31 per cent, was abandoned and in Nebraska, 75 per cent, was abandoned.*

All yields published by the government are based on the acreage harvested. Profits are estimated by taking average costs and applying to average yields. The enormous complete losses are ignored. Prices based on such methods of figuring are more dangerous than submarines.

If prices are to be fixed they should be fixed in the open, rather than through private agreements with middlemen. Newspaper reports have led farmers to believe that prices of corn, beans and many other products are being controlled by such agreements. Such reports lead farmers to believe the wild rumors about government agents doing all manner of impossible things. Announcement of fixed prices should not come through the local dealer else the farmer will believe that prices are being fixed in the dealer's interests. The good standing that the committee that is to fix the price of milk for New York City has with farmers is due to its willingness to hear all the farmers' testimony and to the fact that some of the men understand farming. If prices are to be fixed the farmers ought to be heard, and at least some of the persons in charge should be so familiar with the methods of production that they can talk to the farmer without discrediting themselves in his esteem.

Changes in Farm Practices---Much of the advice now given on the food problem fails to distinguish between what one farmer can do and what all farmers can do. For example, the conference of agricultural officials that met

*U. S. Dept. Agr. Monthly Crop Report, May, 1917, p. 38.

in St. Louis last spring adopted the following: "Milk production could be increased fully one-fourth by the more liberal and intelligent feeding. Pork production could be increased substantially through the more extensive use of fall litters, better care and feeding. The poultry products of the United States could be doubled within a year."

One farmer can feed more at the expense of others but, where would the grain have come from for the more liberal feeding on all farms? The grain was all used. Poultry could be much more than doubled in a year, but where would the feed come from? In 1910 there were 296 million fowls on farms. Many of these were kept as scavengers but additional ones would eat good wheat, corn, and other grains. It would require the equivalent of half of the present wheat crop to feed them.

The advice as to what to plant is sometimes equally thoughtless. The farmer is to increase everything. The real problem is, having a certain amount of labor and having land with certain adaptations what shall be raised? No one but the farmer who knows the every peculiarity of each field can tell what to plant. An increased acreage of wheat and rye are needed. This means less of something else. What shall it be? More grain crops are needed. Shall hay and pasture be plowed up? If so this means fewer livestock. Which kind shall be decreased?

Elimination of Waste—The Food Administration has done much good in its campaign for the elimination of waste. Still more needs to be done.

One of the great wastes of the country is the loss of horse meat. There are over 21 million horses in the United States. Probably over 1½ million are discarded every year. If horses were eaten they would be discarded a little quicker on account of their meat value. This source of meat would go far toward giving meat on the meatless days.

The calves from dairy cows that are not wanted for maintenance of the dairy industry are usually sold for veal.

Some states have laws prohibiting such sale until they are a month old. The laws are exceedingly difficult to enforce. If the age limit were reduced to seven days there would be a great saving. About nine to ten quarts of milk are fed to the veal calf for every pound of dressed veal that is produced by the milk.

Economizing---Economizing has not been advocated to any great extent, possibly because the advertisers dominate so many newspapers. It is not enough to save waste. Economy is needed in clothing, buildings, tobacco, and in everything else. Every man who buys an unnecessary suit of clothes decreases the production of corn and other foods by helping to attract labor from farms. Reducing the number of persons employed in domestic service will add considerably to the supply of labor available for essential industries.

Substitution---Much that is called economy or saving is substitution. It is necessary to substitute corn and oats for wheat, but no campaign is needed for the use of rye or buckwheat because all of these crops will be eaten long before the year is out. Some substitution is injurious because it decreases the production of the product that is to be "saved." Substitution for butter of various oils and fats, commonly called oleo, has gone so far as to injure next year's prospects for butter. This has been encouraged by misleading statements that all are equally good.

Non-essential Industries---The present policy of regulation of prices of necessities is working about as follows. The cost of living is lower than it would be. This leaves more money to spend for luxuries. The luxuries rise in price. The manufacturers of luxuries pay better wages. Labor is attracted from farms and other regulated industries.

Increased Production Means More Labor---There is no solution of the food problem except more food, and the only way to get more food is either to get out of the way and let it be produced, or else do the things that will cause

it to be produced. We cannot get it by wishing or by editorials, or by reducing prices.

Some persons would train city men for farm work, but this is no time for fooling with visionary "back-to-the-landers." They should either dig trenches in France or work at something that they know how to do. There are in America millions of men who know how to do farm work but who are not working on farms. No other industry has such an enormous surplus of skilled labor. That is one reason why prices of farm products are so low. Of the sons of the present farm operators in New York 46,367 are working at other than farm labor. Many brothers of these operators, and many sons and brothers of the hired men have also gone to cities. Investigations on a limited number of farms indicate that about half of the men born on farms remain farmers and nearly half go to cities. Many of the farm reared men in cities are in such important positions that they cannot be spared, but others are ready to go back to farms at any time when farm wages can compete with city wages.

Some persons would have the army sent back to farms at times. The men who are to be sent to France need all the training they can get. No clamor for them as farm hands should be allowed to interfere in the least with their military training. Possibly a week's furlough in harvest might be given to some, but only as the army officers believe that it will not interfere with their preparation for war.

The only way to win a war is with soldiers, ammunition, and food. It is futile to argue as to which of these should get men at the expense of the others. All three should be supplied with men at the expense of industries that are not contributary to these three. Ammunition must sell for enough so that it can get labor. Food must do the same, unless we are ready to conscript all labor for all industries.

Home gardens worked by persons in cities and villages should be more nearly universal this year than last. These

gardens piece out the eight-hour day. They furnish work for women and children. A few hens or a pig should be kept by village families to use the few things that will get by the most saving.

Driving more horses per man helps, and tractors help some. Farmers are working even longer days than formerly. Some can do still more but many are working beyond their limit of endurance. Men who have retired from active farm life are coming back into service to contribute again to production so far as they are able. Children on farms have always worked hard. They are doing more than formerly. The boys' camps were generally successful. They should be increased. Every boy should have some useful work to do this summer. Persons have gone out from cities to help in harvest. All these and many more things help, but they are far from enough. The real source of labor is women. As usual the burden of war falls hardest on women.

Farm women are doing much farm work. They must do more. It is too bad that this must be so. Farm women have never had an easy life. When the war is over, they must go back to their housekeeping. But we are at war and must do many unpleasant things. What I am suggesting is not so bad as what is happening to women in Europe. Farm women have a very different kind of housekeeping from city women. They board the hired man and do his washing as well as the family washing. The chickens do not come prepared for use, but are dressed by the farmer's wife, and are raised by her. The bread and cakes and pies do not come out of the telephone, but are made on the farm. The water does not usually come from a tap, but is carried into the house in a pail and is heated on the kitchen stove. The vegetables are in the garden. They must be gathered and prepared for use. The garden, itself, is usually in charge of the women. They usually wash the milk pails and cans, and often help with the milking. They preserve meat and vegetables, and

pick and preserve fruit. They also raise more children than are raised in the cities. But, some farm women, particularly the grown-up daughters, can do still more.

But the great source of woman labor is in cities, where the housekeeping is simpler, and may be dispensed with by paying board. An increasing number of women must enter the industries and relieve the men. When women do enough work, some of the farm reared men will go back to the farms.

City women who wish to work on farms will contribute most by doing the cooking and washing and allowing the farm women who know how to do farm work to help in outdoor work. Washing the dirty clothes and cooking salt pork and potatoes for hired men sounds much less poetic than being a farmerette, but it is more useful.

Many minor things will help, but I see only two ways of obtaining an adequate food supply:

1. By having an unusually favorable season such as occurs once in five to ten years. Having lived for 29 years in the western part of the corn-belt, I hesitate to place too much dependence on the weather.

2. By having an increased supply of farm labor. Labor might be had by conscription of the entire population and assignment to industries. Believing in democracy in wartime as well as in peace, and knowing Americans, I doubt if we are yet ready for industrial conscription, and do not believe that conscripted labor will produce as much as free labor.

I see only two sources of labor that are large enough to meet the needs,---more labor by women and the lessening of work in non-essential industries.

In order that some of the farm trained men thus released will go back to farms, the prices of farm products must be high enough so that the farms can compete with city industries in the employment of labor and purchase of materials.

More About Beet Top Silage

Denver, Colo., March 5, 1918

Mr. N. R. McCreery,
Great Western Sugar Company,
Longmont, Colo.

Dear Mr. McCreery:

Your favor of the fourth received and contents carefully noted.

In reply will say that in the summer of 1916, I persuaded Mr. Fred Noble, manager of the American Beet Sugar Company, to make some silos to silo his beet tops. He made two or three silos, scraping the earth out about six feet deep in rather sandy soil, taking these beet tops when they were green, and covering them with straw and dirt and earth. During the winter of 1916-17, he fed these tops in connection with pulp, with very good results, in fact, such good results that he installed several silos at his four different feed yards during the summer of 1917, and I think he siloed in the neighborhood of 1000 to 1200 acres of beet tops. These silos were about forty feet wide and 100 to 150 feet long, and about six feet deep. He put in green beet tops and straw, mixing it together and they have been feeding it this winter.

I have made two trips to their feed yards and they are feeding these siloed beet tops in connection with pulp, cutting the ration of pulp about one-half. Their cattle have done exceptionally well, in fact, they have marketed about 40 per cent.

I firmly believe that if the farmers in northern Colorado would silo beet tops properly, and feed with or without pulp, it would increase the value of their beet tops double. When I say double, I mean get twice the results net to them. I have been convinced of this for the last three years.

I am sorry I cannot give you the figures, as I have not been directly interested in feeding these cattle.

Anything further you might want let me hear from you. I am,

Very truly yours,

BEN KEMPER,
Of the Denver Live Stock Commission Co.

In connection with the above letter, the following article by Mr. Frank Noble, manager of the American Beet Sugar Co., concerning the cattle and beet top silage mentioned in Mr. Kemper's letter is of great interest:

Beet Top Silage

Frank Noble, Manager American Beet Sugar Company

As far as we know at present, there is no way in which greater profit can be realized from beet tops than by siloing them and feeding them during the winter to fattening cattle and young stock, dairy cows and sheep. In Germany and several of the older beet growing sections of Europe, this method has been successfully followed for a great many years.

The cost of siloing tops is comparatively slight, ranging, under ordinary circumstances, from $1.25 to $2.00 per ton. This includes the initial cost of excavating the silo, the value of the tops, straw and salt used, and the cost of hauling to the silo and filling.

By siloing the tops, not only they themselves, but also the straw is made very palatable to stock, and as this mixture comes out of the silo warm, cattle will eat it greedily. Practically none of the food value is lost and the fermenting process destroys the beet disease-producing organisms, so there is no danger of infecting fields by spreading manure from cattle fed on this silage.

Location

The silo should be dug on some well-drained spot, close to the feed lots, and the ground should slope away from it

in all directions so that surface water will not run into the pit.

Construction

A satisfactory sized silo is one excavated to about 5 feet in depth, 8 to 12 feet in width at the bottom, the top width being just enough greater to give the sides whatever slant is required to prevent the earth from rolling back in while the silo is being dug. The bottom should have sufficient slant to drain off well, if it is not porous.

Most of the excavation work can be done most economically with a slip. The two ends should be so graded that the wagons can be driven right through the silo.

Preparation of Tops

The best results are obtained by putting the tops in the silo promptly, not to exceed two days after they are topped. It is important to have the tops as free from dirt as possible, and care should be taken in picking up the tops to shake off all the dirt.

Filling the Silo

The essential point in preserving the tops is in thoroughly packing them, in order to effectively keep out the air. This is especially true of the edges where the tops come in contact with the walls, so that no air can enter from this quarter.

It is advisable to put a 4-inch layer of straw on the bottom of the silo, to keep the tops from coming in contact with the ground, and a slight sprinkling of straw can also be put on the sloping sides to keep the tops from coming in contact with the soil. On top of the layer of straw place a six-inch layer of beet tops, then about three inches of straw and so on, alternating the layers until the pile is about 3 or 4 feet above the ground. The palatability is improved by scattering salt over each layer of tops at the rate of three pounds of salt to the ton of tops.

General

In filling the silo, special care should be exercised to pack the tops and straw thoroughly to exclude the air.

This may be done by the use of a horse, mules or land roller. In filling the pit, the wagon-load of tops or straw may be passed directly over the previous filling in the pit.

The silo need not all be filled at once, but extra layers can be added each day, care being taken to make a complete layer of the tops each day, and then putting on a layer of straw the same day. The filling may be continued during the whole topping season. The last layer on the silo should be straw, and on top of this about one foot of earth should be put, in order to weight down the contents and to exclude the air. No water should be put in the silo, as there is plenty of moisture in the tops.

From four to six weeks are required before the silage is in good condition.

A bunch of 135 steers was bought in Denver October 24th at an average weight of 958 lbs., and was sold in Kansas City, a carload at a time, as fast as they were finished. The average feeding period was 115 days and the average daily gain for the entire period, from the time they were bought until they were sold at Kansas City, shrink included, was 2.3 pounds.

These cattle were first pastured on beet tops, then fed wet beet pulp, refuse molasses, alfalfa hay and cottonseed cake, increasing the amount until December 16th, when put on a full feed of the following ration:

3 lbs. cotton cake
4 lbs. refuse molasses
25 lbs. beet top silage
60 lbs. beet pulp
10 lbs. hay.

This ration is for a quick feed of about 100 days. The ration may be changed to suit feed available, increasing the beet top silage to 60 lbs.

Dirt Pit, Beet Top Silage

Green beet tops 25%
Straw 5%
Salt, 3 lbs. per ton tops.

Cost Per Ton of Silage

Value of beet tops at rate of $4 per acre	$ .80
Straw, at rate of $1.00 per ton	.10
Salt, 3 lbs. at 60c per cwt.	.05
	.95
Hauling tops and filling silo	.70
Initial cost excavating silo, per ton capacity	.10
	$1.75

Comparative Analysis

	Beet top Silage	Corn Silage
Moisture	64.36	68.50
Ash	9.25	1.51
Crude Protein	2.87	3.12
Crude Fat	.44	.80
Crude Fiber	5.46	6.53
Nitrogen Free Extract	17.62	20.54

The results of feeding the beet top silage have been exceedingly satisfactory and economical, and a large amount of the tops grown in this locality will be used in this way during the coming season.

Supplementary Data on Beet Top Silage

In estimating the amount of beet top silage furnished from one acre of beets, it can be calculated at approximately 35% of the weight of the yield of beets.

A ten ton crop of beets will ordinarily furnish sufficient tops to make 3½ tons of cured silage. A very heavy yield of tops will make 5 or 6 tons of silage per acre.

One ton of green beet tops requires about 38 cubic feet silo capacity. If well packed, a silo 5 feet deep will settle from 8 inches to 12 inches.

One acre of good tops yielding four tons of silage will furnish three steers 25 lbs. of silage per day for 107 days.

Notes

H. C. Giese
Agr. Supt., Ft. Morgan and Brush

IF you find it necessary to use a roller, would suggest that you use the Western Land Roller, made in Hastings, Nebraska. If a roller cannot be secured, a disk set straight and used on your seed bed will also perform very well. Always roll crosswise instead of lengthwise on your planted field.

Better living quarters, and other little concessions to your labor will mean satisfied labor and better work.

The man who has sandy land should not fail to look at his beets after each rain, as "a stitch in time saves nine."

The grower that harrows, cultivates or rolls his beets before the wind blows them out will save the cost of replant seed, cost of preparation of the land and besides he will have his beets thinned at least two weeks sooner and from three to five tons more beets than the man who forgets that the wind might blow tonight or tomorrow.

The man who does not look after his beets after he has hauled manure all winter, plowed, harrowed and the Lord knows whatnot, is certainly neglecting a whole lot of hard work and expense.

Look out for the land that has been plowed from stubble alfalfa, it may be firm at the time you plant but it will fluff up, get loose and dry out, and the beets will die if it don't rain. In this case roll and the little beets will come on and do fine.

The man who planted deep will wonder why they don't come up. On the other hand, the shallow planted will be up in a few days.

Don't get on the land too soon after a good rain; wait till it dries then give it a good harrowing, follow up with the planter and you will get a good stand. Don't plant after a rain without harrowing.

Be sure to get a firm seed bed, it is more important now that you have a good seed bed for as the weather becomes warm and dry, the moisture cannot stay near the surface like it does the fore part of the season.

Some farmers do not seem to be able to get away from the idea that they do not have time to harrow their ground after the float, before they plant. They do not realize that the reason the surface of their ground looks so smooth is that they have pushed the most of the dry clods down into the ground right where the seed will be deposited by the drill, instead of having fine dirt for seeds to lie in, as would be left by the harrow. It also leaves the ground in better shape for the wind to affect it, as well as to cause more capilliary attraction of the lower moisture, which you are trying to save to give the beets a better start. We are not having as much of this planting on floated ground as heretofore, but hope to see less this year.

We notice that some of our farmers who are breaking up alfalfa ground for beets this year are getting up a good deal of new soil, perhaps too much. If they will give this ground a thorough disking, after the first harrowing, it will well repay them in the germination of their seed, as this mixes the soil as well as packs it.

Quite a number of the farmers are rolling their ground this year to help pack it as well as to crush the clods. A sub-packer is better, but if you do use a roller do not roll when the ground is too wet, as there is nothing which takes the life out of the ground any quicker than rolling when the ground is in this condition.

We notice more ditchers on planters this year than ever before. We are glad to see it as they answer a three-fold purpose. They help to check the ground to let the plant through; also to keep the wind from whipping the young plants off, after they are up, as well as being a great help to the farmer in the first cultivation, making a track for his team to follow.

We have found men drilling beets each spring where they said they were planting beet seed 1¼ to 1½ inches deep, and upon investigation, the seed was from ½ to 2½

inches deep. The farmer had not investigated to see where the seed was going, he was just drilling beets. Another farmer was working a Deere drill and had the press wheel working loose in the regulation slot, with the result that he had seed all depths from top of ground to three inches.

The thinning and cultivating will possibly be started before the next issue of this paper and we wish to say something about the cultivation. The mistake most frequently made in the first cultivation is not working the soil sufficiently deep to have enough loose soil or mulch to prevent the soil underneath from baking. You have often noticed when you were cultivating the second time after a shallow cultivation, that by deep cultivation the first time this will not be the case.

Now about thinning: Get your labor started right, then visit your field often and encourage them to good work. Get your labor to work early, as early thinned beets are the best by far, but remember that good work by the laborer is dependent upon good work by the cultivator. No one has the interest in your crop that you yourself have.

The time to take out doubles is when they are small during the first work.

Cultivate as soon as you can see the rows, then---cultivate some more.

Before resorting to replanting, the thin stand should be inspected carefully and counts should be made to see whether there are enough small beets left to have on the average one plant per 16 inches of running foot of rows. Experience has shown that fields which, on superficial inspection, look hopeless, in reality have often enough beets left to make a better yield than replanting would produce.

The harrow as now constructed, is so arranged that if properly hitched the teeth will not follow each other or "track." If the teeth do "track" change the hitch, as you are not really harrowing unless each tooth stirs its own particular strip of soil.

Do not be discouraged if your field looks worse after harrowing than it did before. The harrow has a way of dragging clods to the surface and letting the fine soil down to the seed bed proper where it is needed. A clod on top of the ground is far less dangerous than one a few inches under the surface.

Wheat—Dried Beet Pulp—Potatoes

(From "Hoard's Dairyman")

WHICH would be the best, ground wheat or barley in a mixture of bran, ground up oats, oil meal, and beet pulp? The price of wheat and barley is about the same. The wheat cannot be made into flour, being of inferior quality. Is sugar beet pulp worth feeding at the price of $37 per ton?

Would you advise feeding potatoes to milk cows? Have been experimenting on two cows of my herd and find I am receiving about 1¼ cents per pound for the potatoes at the rate milk is now. Have been feeding 6 lbs. a day to each cow; the market price for that kind of potatoes being ½ cent per pound. But have been told that potatoes will dry up the milk flow.

If a cow tests 4 per cent with the first calf, would she go above or below said test with her second and third calf on the same kind of feed?

Would you advise building a silo, or would it be of as much benefit to me putting the same amount of ground that I would require for corn in grain and milling it into feed for the cows?. O. S.--Beaverton, Ore.

Dairy cows will pay a very good price for wheat which is damaged. In the concentrates listed wheat would not have a value greatly exceeding that of barley. It is some-

what higher in protein and will combine very well in a concentrate mixture.

Dried beet pulp at $37 per ton is a very economical purchase considering the price of other feeds. We consider it approximately equal in feeding value, pound for pound, to corn. At $37 it deserves a large place in the dairy ration. It may be fed dry or may be soaked 12 to 24 hours in three to four times its own weight of water.

We would not feed more than about thirty pounds of potatoes per cow per day. More may be fed if the potatoes are cooked than if they are raw. The dry matter in potatoes is about equal to that in silage and, under most conditions, is considerably more costly. If the experiments with the other feeds indicate that the cows will pay 1¼ cents per pound for potatoes when the market price is ½ cent per pound, we would by all means prefer feeding potatoes to cows. Potatoes will not dry up the milk of cows but if fed in large quantities give an undesirable flavor to the milk. It seems to us, however, that every effort should be made to find a market for these potatoes so that they may be used for human food. Thirty cents per bushel for potatoes is altogether too low, when the price in larger cities is very much higher and when all kinds of human food is very high priced.

A cow which tests four per cent with her first calf will test fully as high or a trifle higher with her second and third calves. She will continue her high test under normal conditions until she gets so old that she begins to weaken a bit, when the fat per cent may decline slightly.

We thoroughly believe in the value of silos and believe that where crops suitable for silage can be grown, no system of feeding is as economical as that which preserves a considerable amount of such a crop in a silo. Under Wisconsin conditions, where more than 500 farms were studied, it was found that the increased profits on those farms which own silos was about $340 per year over that on farms which did not have silos—about enough to pay for building the silo the first year.

Problem of Germination in Semi-Arid Soil

E. R. Parsons
(From "Western Farm Life")

IN the eastern states where there is plenty of rain, the germination of seeds is not a problem that demands the earnest consideration of the farmer; but in the dry farming country, especially in dry years, this subject is one of much importance, for poor germination means a reduced crop, and perhaps no crop. Seeds require from two to four times their own weight of water in order to germinate properly, therefore free water in the soil is indispensable.

Once established plants can live and absorb moisture from the soil when the water content is as low as 8 or 10 per cent; but for the germination of seeds some 20 per cent or more is needed.

In our ordinary western soils the water commences to move by capillarity at about 15 to 17 per cent, according to the quality of the soil; but below this amount the film water which is wrapped around the granules remains where it is, and cannot move to the seed to assist in germination. Therefore to promote the growth of newly planted seed, there must first be sufficient precipitation to soak them up, and then enough free water in the soil to carry them until rooted.

The hair roots commence to appear in a very few days after sprouting, and the plant is then practically self-supporting without free water, for these hair roots possess the faculty of absorbing film water; they are the tongues which lick the moisture off the soil granules.

This is the Critical Time

It is evident then that the critical time is from the swelling of the seed to the period when the hair roots are developed, and in order to meet this emergency the farmer must prepare his seed bed accordingly.

The most important operation towards this end is the proper packing of the seed row. The philosophy of it is this---the more dense the soil the greater the capillary attraction for free water. In the same manner that a brick will steal water from a sponge so the dense or more solid soil will take from the looser; therefore on account of the packing, the water is drawn as if by a magnet from the looser soil to the seed rows.

This is also a good argument for not over packing the whole surface of the seed bed, for if this is done the seed rows have no special advantage over the rest of the field. For the above reasons crops that are broadcasted and harrowed in are much more likely to dry out in the sprout, between showers, than those which are put in with a press drill.

It is possible also to overpack the rows, particularly those of alfalfa in a heavy wet seed bed. It is best to plant these fine seeds always at the wettest season of the year, which is usually in the early spring, and use chain drags for packing purposes. Many a stand of alfalfa and clover has been lost through a crust forming in the seed row on account of too much packing, especially on clay land. On account of the difficulty in properly germinating the seeds of such crops as winter wheat, fall rye, etc., in the ordinary dry weather of October and November, we always recommend the early planting of fall crops, in order that the seed may be thoroughly soaked up by the late rains which so often come about the end of August and beginning of September.

Do Not Plant Shallow

They should also be drilled in about three inches deep, for if planted shallow there is always the danger of sprout-

ing after a light shower and then drying out before the arrival of more rain to keep them going; but when planted deeply there is little danger of this, for when the precipitation is sufficient to go into the soil three inches deep and germinate the seed, there will be enough also to establish the plant.

There are some seeds such as corn which often do not germinate satisfactorily even when the soil conditions are right. All large, starchy seeds absorb hygroscopic moisture in damp weather, especially the germ, which sometimes contains as high as 20 per cent of water, although the seeds themselves appear perfectly dry. It is this moisture which ruptures the cells and destroys the germ when the temperature falls to near zero. Ordinarily freezing seldom injures a seed, for the reason that the viscid matter in the germ cells does not freeze as easily as the water or even sap; but such seeds as corn, beans, sorghum, etc., must be protected from low temperatures which may freeze the germ solid.

The germinating potency of seeds lessens with age, especially after the fourth year. This deterioration is due to the delicate nature of the dormant protoplasm in the germ, and the unstability of the carbon elements composing the matrix, which become more and more oxidized as time passes.

Indigenous seeds do not rot in the ground, and may remain uninjured for years until brought to the surface by some agency when they commence to grow. On the other hand, exotic seeds, such as corn and other semi-tropical varieties, rot very easily with much moisture at low temperatures.

Feeding Value of Sugar Beet Molasses

T. E. Leiper
(From Colo. Agr. College Bulletin)

IN order to determine the feeding value of sugar beet molasses, the Colorado Experiment Station placed 200 lambs in their lots on experiment, October 20, 1917. One lot was fed whole barley in reversible troughs, and whole alfalfa in self feeder. The other lot was fed sugar beet molasses in reversible troughs, and whole barley was placed on top of the molasses, while alfalfa was fed in the self feeder.

Barley was bought for $2.65 per hundred; alfalfa, $17.50 per ton; and sugar beet molasses at $25.00 per ton. The lambs were on feed 102 days.

The barley-fed lot made an average gain per head of 25.92 pounds. It took 374 pounds of barley and 779 pounds of alfalfa to make 100 pounds gain at a cost of $16.65. The lambs were sold in Denver at $15.75 per hundred.

The barley-molasses fed lot made an average gain per head of 26.71 pounds. It took 289 pounds of barley, 112 pounds of sugar beet molasses, and 754 pounds of alfalfa to make 100 pounds gain at a cost of $15.59. This lot was sold the same way and at the same prices as the barley-fed lot.

These observations indicate that sugar beet molasses possesses about 75 per cent the feeding value of barley; i.e., 100 pounds of sugar beet molasses will give the same gain as 75 pounds of barley. Further work will be needed to determine average results. In this particular experiment, molasses effected a saving of 25 cents per head on cost of feed.

A bulletin will be published in the near future, giving details of this experiment. If you care to receive further information, write to the Colorado Experiment Station, Fort Collins, Colorado.

Sugar Beet Culture

J. A. Brock
(From "Facts About Sugar")

Right Depth Important

SUGAR beet seed should be planted just as shallow as is consistent with quick and uniform germination. The grower should bear in mind that the quicker the leaves get through to the light and the roots strike down into the firm root bed the better the stand and the stronger the plants will be. It has been found that the depth of planting will vary with the nature of the soil, the amount of soil moisture present, and the location of the moisture boundary. Care must be taken to plant at such a depth as will permit the seed to rest on well firmed, moist soil. In some cases it will be found necessary to go a little deeper than is usually recommended in order to secure the right conditions; nevertheless experience has shown that it is better to do this and to cover the seed with dry soil than to plant the seed in loose, moist soil, which would dry out before the seed had time to germinate.

If the seed bed has been properly prepared and cared for previously to the time of the planting, the soil, under normal conditions, will contain sufficient moisture and will be sufficiently firm at a depth of from ½ to 1½ inches. Should it be found necessary to go deeper to reach the right soil conditions it usually indicates that the seed bed has not been properly prepared or that proper moisture conditions have not been maintained.

Use of Proper Drill

Seeding is usually accomplished with a special beet drill. At the present time there are several first class drills on the market. One of the best beet drills which has come under the observation of the writer is the John Deere No.

5 beet drill, which is manufactured by John Deere of Moline, Ill.

Standard makes of beet drills are so constructed that they will drop the seed evenly and at a uniform depth providing the land is properly prepared. Under no circumstances should drills having flat rimmed press wheels be used, as these will pack the soil in such a manner as to retard the growth of the plant. The press wheels having concave rims are the kind to be used. These press the soil firmly on the side of each row of seed and at the same time leave a fine line of unpacked soil down the center which will absorb water if rains come, permit sufficient oxygen to reach the seed, and permit the seedling to break through without difficulty. The press wheels play an important part in holding or bringing the moisture up to the seed and therefore they should be set so that they will exert a firm and uniform pressure on the drill row.

Attention is also called to the importance of having the drill shoes uniform. This is a matter which can easily be adjusted before taking the drill into the field.

Width of Rows

Modern beet drills are so constructed as to permit the proper spacing of the rows. In determining the distance between the rows the writer would advise the inexperienced beet grower to consult a member of the local sugar company's agricultural staff, as this is a matter which is governed to some extent by local conditions.

Under no circumstances should the rows be closer together than sixteen inches nor further apart than twenty-four inches. Experience has shown that the best results are usually obtained when the rows are about eighteen inches apart. It has been found that if the rows are too far apart the roots will have a tendency to become too large and the tops will be too large compared with the roots, with the result that the yield will be smaller, the

sugar content and purity lower, and the conservation of moisture less than with close planting.

Growth of the Seedling

The period between the planting of the seed and the appearance of the leaves above the ground is the anxious time for the beet grower. It is during this period that the germination of the seed takes place and it will pay the beet grower to give careful attention to his field during this period.

Attention is called to the fact that until the cotyledons (seed leaves) appear above the surface the food required by the growing plant is supplied by the nutriment stored in the seed. As soon as the seed absorbs sufficient moisture to break its walls the rootlet appears and starts its downward growth. The depth to which it will penetrate depends upon the food content of the seed. In other words the root development is entirely dependent upon the seed for its food until the time when the stalk breaks through the surface and the leaves of the seedling are able to supply the food for the growing plant.

Under normal conditions the stalk of the plant will start to develop from three to four days after the root tip appears. It will be noted, however, that the stalk makes a rapid growth after it first appears. This is explained by the fact that the amount of food stored in the seed will not last more than six or seven days and therefore it is necessary that some means of supplying the plant from outside sources be provided as soon as possible. This also explains the reason for shallow planting. If the stalk has considerable distance to go before it reaches the surface, as is the case in deep planting, it is obvious that the strain on the seed will be very great.

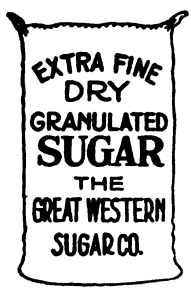
In view of these facts the grower should do everything within his power to make it easy for the stalk to break

through the soil surface. If for any reason the stalk does not reach the surface one week after planting it is very probable that the seedling will die from starvation or suffocation.

Breaking Surface Crust

If the soil has been properly prepared and good seed has been planted the seedling will make its appearance above the ground about the fifth or sixth day. Should a crust form upon the surface before the seedling appears it should be pulverized at once. This may be accomplished by using a harrow or an implement made especially for that purpose. In previous articles the writer has called attention to several implements which are especially adapted for this purpose. If the harrow is used the teeth should be driven back or thrown so that they will drag lightly over the surface. If the plants have reached the crust it is suggested that a "spider" be used in place of the harrow. This will break the crust without injuring the plants.

Shortly after the seed has been planted the grower is advised to start cultivation in order that the growth of weeds or grass may be destroyed. These first cultivations are accomplished with special beet cultivators, which work several rows at a time. These cultivators are adjustable to the width of the rows and usually have small, loose, sharp knives running parallel with the surface and designed to cut the grass and weeds just below it.



Raise Sugar

Would you help to win the war?
Raise Sugar.
Our allies' voices from afar
Call for Sugar.
We cannot go to fight,
But we can with all our might
Raise Sugar.

There are thirty States that can't
Raise Sugar.
There are fortyeight that want
Beet Sugar.
Then let us not be slackers,
And to prove we're Sammy Backers,
Raise Sugar.

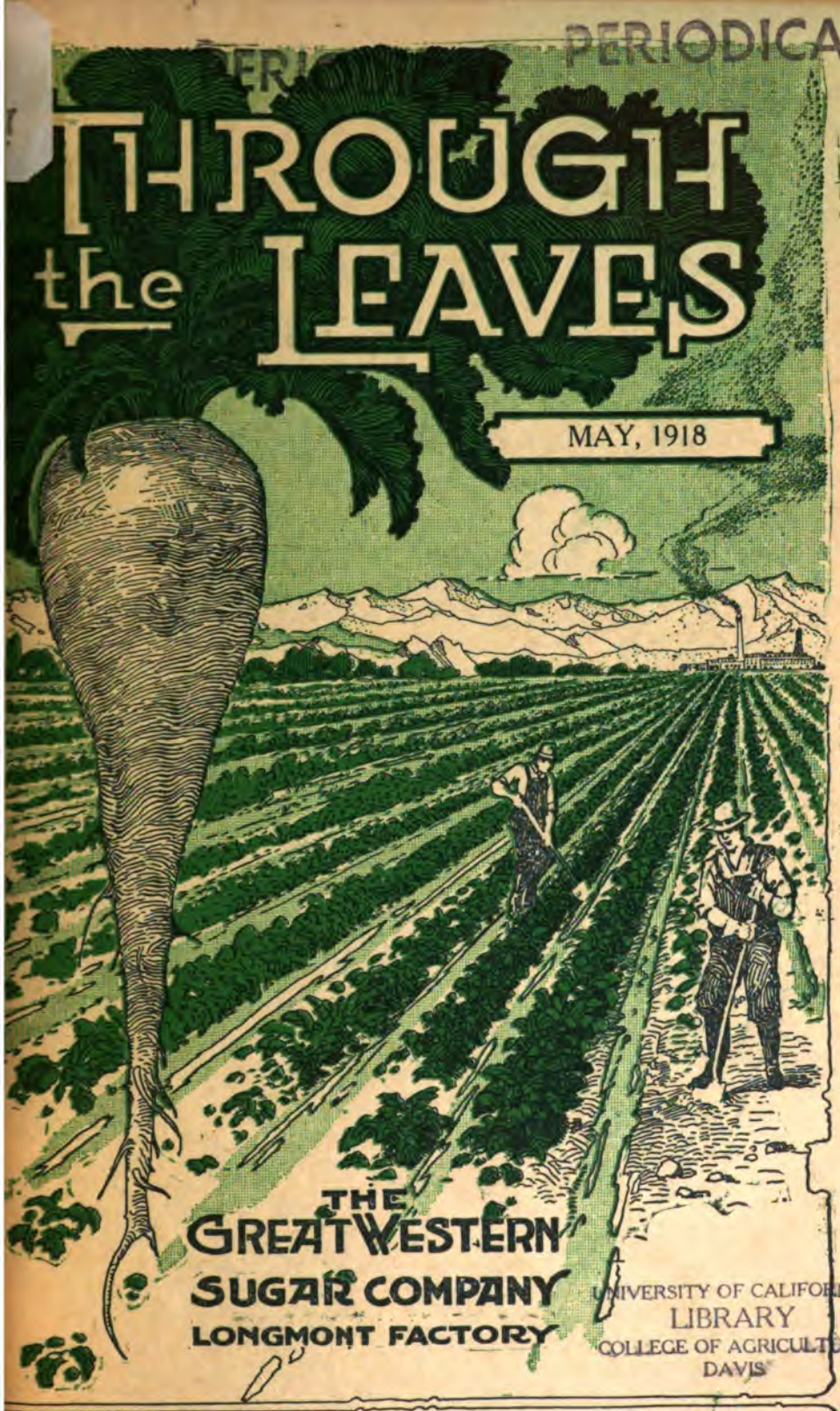
Colorado's beans and wheat
Need Sugar,
To make them fit to eat,
Beet Sugar.
Then let us with our might,
All of us who cannot fight,
Raise Sugar.

The workers in a hive,
Make Sugar.
The drones, as much alive,
Eat Sugar.
If you'd choose the busy life,
Best aid those engaged in strife,
Raise Sugar.

PERIODICAL

THROUGH the LEAVES

MAY, 1918



THE GREAT WESTERN SUGAR COMPANY
LONGMONT FACTORY

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Insect Pests Destroying Wheat in Boulder County

Considerable damage is being done n some sections to the wheat crops y small white maggots. These mag- ots are the larvae of a two-winged ly, and they destroy the plants by ating out the heart of the stem.

Last week investigations were made of fields in various sections and some were found to be badly damaged, in fact, so badly that they were being prepared for other crops. The state entomologist tells us that a great many complaints have come to him from the section between Longmont and Loveland, but on investigation they find most of the injury due to wind and drought during fall, winter and early spring.

Mr. Maxson, who is an entomologist, accompanied the county agent on an investigation of fields last week. Regarding these maggots he says:

"The larvae or maggots of several minute flies injure small grains, especially wheat, by boring into the stems and eating out the heart of the young plants.

"There are several broods of these flies each summer. The last brood in the fall deposit their eggs on volunteer and fall grains and grasses. The maggots hatching from these eggs spend the winter in the stems of the grain and grasses and complete their development the following spring. By the time they have reached their full size as maggots, the heart of the grain is destroyed.

"During seasons like the past, when there is such warm weather during late winter and early spring, the hibernating maggots develop into adult flies so early that spring grain is severely damaged by the next brood. Many acres of grain, both fall and spring, have been practically killed out during the past two or three weeks. At this time the maggots are about full grown. If barley or oats are planted on these fields there is a great probability that they will be injured by the next brood of maggots. These maggots do not injure sugar beets, corn or peas and beans. Therefore, when you have lost a field of winter or spring wheat, it is advisable to plant some of these other crops instead of small grain."

THROUGH THE LEAVES

MAY, 1918

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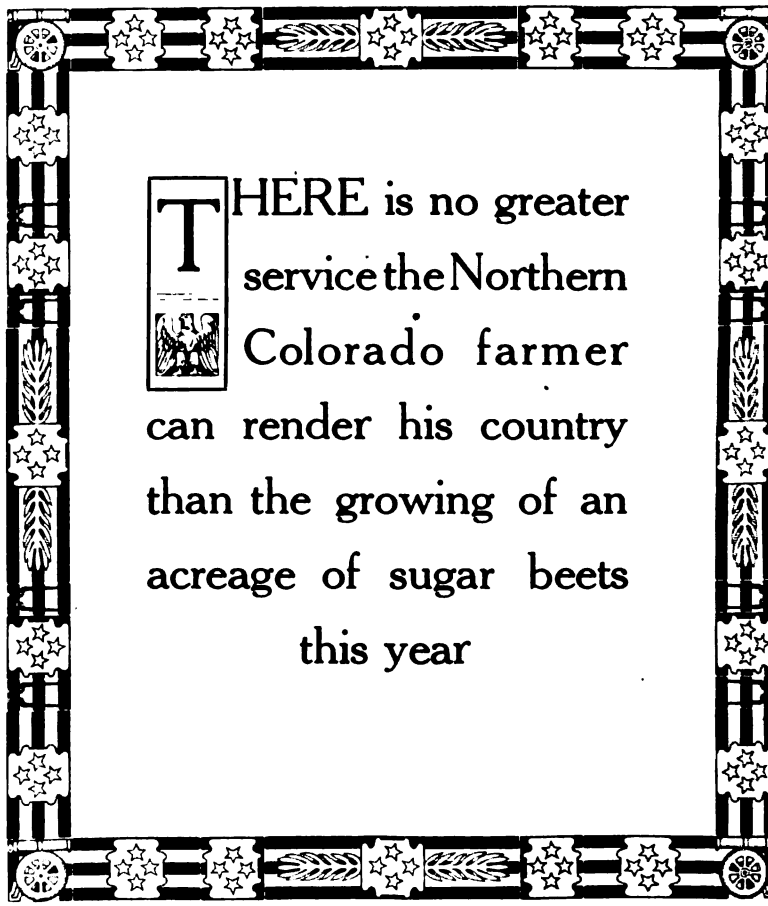

THERE is no greater service the Northern Colorado farmer can render his country than the growing of an acreage of sugar beets this year

NOTES

N. R. McCreery

We are proud of the showing the Colorado farmers have made in the recent Liberty Loan drive. We knew all the time if they understood the urgent call of the Government they would not be found wanting. Another call has come now, that we hope they will meet just as effectively. The Food Administration is calling for increased sugar production this year, in order that ships may be saved to send soldiers and supplies to the battle line in France.

Perhaps you did not realize before that the Nation's call to the Sugar producing districts was urgent and had planned to grow other crops on some of your land. As a result the beet acreage is far short of normal, and the State of Colorado, which has led all others in the production of beet sugar, bids fair to take a backward step; and instead of increasing the sugar supply the indications are that it will be much reduced.

It is not too late for many of you to increase your acreage just a little. Already some have more than doubled theirs when they learned of the need for more sugar. We have about 1,000 growers in the Longmont district. If each one increased his acreage only a few acres, the aggregate will be something well worth while. Each acre means one and one-half more soldiers to France.

All farm organizations are united in the effort to increase Colorado's sugar supply.

This is a time when of all times within the knowledge of any of us, we should try to make every acre produce the maximum yield of all crops. This applies particularly to the beet crop. In spite of all efforts that can be made the acreage this year will not be equal to that of last. Part of this shortage can be made up by more careful tillage and care of the crop, so that the tonnage per acre can be increased. Increase in tonnage per acre will help to offset the decrease in acreage, but efforts along both lines are needed.

\+ + +

Thinning time will soon be here. This is one of the critical times in the life of the beet plant. We believe that every year there is much loss in tonnage by careless work of the thinners. It will pay you well to give this work your personal supervision. Our fieldmen are at your service for anything they can do, and the more you call on them the better we will like it.

Sometimes the labor is not willing to do the work just as you think it should be done. We would urge that you do not quarrel with your help under such circumstances, but call your fieldman and let him handle the matter. This will relieve you of the unpleasantness arising from hard feelings that might be created, besides that is what your fieldman is for.

\+ + +

Cultivation is one of the prime essentials to a good beet crop. This is especially true in the spring when the beets are small and the ground is cold. The cultivation warms the ground and stimulates the little plants at a time when stimulation is needed.

Why Sugar Beets?

H. Mendelson

IT has been said many times during the last year that "Food will win the War."

Probably 90% of the real food value consumed is obtained in the form of flour, meat fat and sugar.

Between 10%-15% of this real food value is eaten in the form of sugar.

The average production per acre of sugar beets in the United States, last year, was about 2800 pounds of granulated sugar. The average yield, last year, of wheat, was 14.2 bushels---852 pounds, or not more than 650 pounds of flour.

The government's estimate of the yield of spring wheat, in Colorado, was 22 bushels in 1917; that of winter wheat was 22.6

In our northern Colorado beet districts, the yield was undoubtedly higher.

Even a 40-bushel wheat yield---2400 pounds, will produce only about 1820 pounds of flour, and it is very doubtful whether the average yield was that high.

The milling by-products from a 40-bushel crop of wheat are about 580 pounds of bran shorts or middlings. The by-products from an acre of beets are about 2 tons dry beet tops, 1200 pounds dry pulp or 3.5 tons of wet pulp and about 300 pounds molasses.

These by-products of an average acre of sugar beets have about four times the food value of those of an acre of wheat yielding 40 bushels, which means that if properly fed, they will make four times as much meat and fat.

Besides there is 1000 pounds more sugar than flour.

An acre of barley yielding 2000 pounds, can, of course, be transformed into flour if there is not wheat enough and would yield probably not more than 1500 pounds flour

of no higher food value than wheat flour.

If this barley is fed to hogs, you may expect to get 400 pounds live weight from it, corresponding to about 300 pounds dressed weight.

These 300 pounds pork do not contain as much nourishment as either the 2000 pounds of barley they are made from, nor the 2400 pounds of wheat which might have been grown on the same land, nor the 2800 pounds of sugar, plus the meat made from the pulp, beet tops and molasses, which also might have been produced on the same land.

It, therefore, may be said that in beet growing sections, land devoted to sugar beets will produce a total amount of human food in excess of any other crop which might be raised, including not only grain but also potatoes and beans.

Now, of course, it costs more to raise an acre of beets and transform the products into sugar and meat, than with other crops.

From a national point of view, this is only important if it means that the men and horses engaged in raising beets and making sugar and meat therefrom, eat so much food that what is left of the food value of the beet products for shipment to other districts is less than if other crops had been raised.

Careful calculations, too intricate to reproduce here. show that the food consumed by the members of all families engaged in the work on the farm and the factory cannot possibly consume during the whole year, more than 20% of the total food value produced from the beets.

Of course, part of the gross food value produced from an acre of wheat or barley is also consumed during the process; although not as large a percentage.

Therefore, even making allowance for the higher cost of producing sugar and meat from an acre of sugar beets, as expressed in food consumed during the manufacturing process in fields and factories, it still remains true that a given acreage in beet raising districts, devoted to sugar

beets, produces more human food available for shipment to other districts than if used for other crops.

This is the fundamental reason for the sugar beet industry and is more important today than it ever was before.

Now, of course, neither beet producers nor manufacturers are in the beet business for this reason. The business must pay profits to the individual if it is to be continued.

Some farmers claim there is more money in grain, in potatoes and beans.

How much more?

Grain yields last year were the highest on record for a long time. Calculate average yield of beets at $10.00 per ton against average yield of wheat of 30 bushels at $2.00. Which looks the better?

Another consideration: We shall need wheat in 1919 just as bad as in 1918. There are this year, already, many fields having the second wheat crop in succession. Some wheat has been drilled in the stubble after a little double disking.

You have to farm next year again.

Generally speaking, the most successful farmers, financially, are those who stick to the same crop system and feeding system, year by year.

The speculators trying always to sell at the top of the market and buy at the bottom, seldom come out with a whole skin.

Mr. Hoover's commission found the average cost of raising an acre of beets as $90.00. This included full wages for every stroke of work done by horse and man, in the majority of cases assuming that every acre was manured. It included cost of supervision every farmer is supposed to give to the crop. It included depreciation and maintenance of the tools used. It included rent calculated as one-fourth of the crop, meaning of course, that a land owner at the end of the year, if he received no more than $90.00 for his crop, would have left full wages for work

done and the amount charged for rent. A twelve-ton crop at $10.00 per ton would bring $120.00 per acre and therefore there would be left to the land owner, in addition to the items mentioned and not counting the beet tops, $30.00 more.

Is this a losing proposition?

In addition to this, this year's beet acreage is in better condition to raise wheat in 1919 than if it had been in grain this year.

A large number of farmers take this into consideration and will have this year, as many acres of grain and beets as last year and presumably will do the same next year.

There is, of course, the argument that when you raise grain you are through farming, say, by September 15th and have the cash in bank. If you raise beets, you have two months' more work.

This argument will appeal very much to our soldiers in France when they have to get along with less sugar than they are entitled to.

There is finally the argument that there will not be labor enough. There was enough labor last year, as is proved by the fact that the beet crop was harvested and delivered in less time than ever before.

Better organization of the farmers will prevent what happened last fall when everybody was frantically bidding against everybody else for the labor available. Besides, the Sugar company is going to do their utmost to assist and they are not in the habit of falling down on a job like this.

The nation needs the sugar and the meat. If the sugar is not produced n the beet raising districts, it has to be shipped from overseas. The ships are sorely needed for other work.

You are making money producing the sugar.

Whatever profit the Sugar company will be allowed by the government will be taxed at a much higher rate than the farmers' income will be. Therefore, even at this late hour, you should plant every acre you can.

Early Essentials for Best Tonnage

H. H. Griffin

Agricultural Superintendent, Fort Collins Factory

ANOTHER planting season is upon us, and never before has it been so essential for the farming operations to be so conducted as to give the greatest possible returns. Our public officials not only advise, but urge upon us the greatest possible production to meet the needs of those vast armies of which some of our boys may form a part. Every additional ton of beets over what is ordinarily grown is just so much toward complying with this request.

There is no other crop grown that produces nearly as much food per acre as an acre of sugar beets. This is readily seen to be true when you reflect that in addition to the sugar, vast amounts of meat are produced with the by-products (pulp, tops and molasses).

By careful and painstaking effort it is easily possible to increase our tonnage at least two tons per acre over the average ordinarily produced which will be equivalent in results to setting apart 1500 or 2000 acres for other crops, besides redounding to the financial benefit of the grower. Nearly all growers maintain that what is termed "early beets" are the most profitable, and thus it is for the best interests that we take all necessary precautions to get good stands and avoid replanting.

We have frequently stated to the grower, and I wish to emphasize it that no other factor is so prolific in causing poor stands and thus reducing tonnage as the crust that usually forms before the beets appear. To success-

fully meet this condition of a crusted soil, two things are primarily essential. First, a well prepared, firm seed bed, so that the drill in planting will make but a slight depression. Second, a light harrow (especially constructed) at hand to combat the crust at the proper time. Without a properly prepared seed bed it is quite difficult to give the little plants relief with any implement whatsoever. With a compact bed beneath by which the young rootlets can come in easy contact with the soil, and with the surface not crusted, allowing the leaves of the plants to easily and quickly get the sun and air, the crop is started under most favorable conditions.

Breaking the crust with a light harrow is a most efficient cultivation. It relieves the danger of the small beets being destroyed by winds and frosts, and it puts the soil immediately in the row in fine condition for blocking and thinning. It further aids the bacterial action of the soil much to the benefit of the small plants. To some this may seem unimportant, but it is a very important consideration. In order to satisfy yourself in regard to this, break the crust on a portion of land as I have suggested, leaving some near by in the crusted condition, and notice the thrifty green color of the beets in the former as compared with the yellow appearance of those in the latter.

Another advantage in the use of this implement is the rapidity with which the work may be done, which is often quite essential. The crusted soil is usually attended by a more or less wet condition of that portion immediately underneath the crust, for which reason we should avoid the use of anything that has a tendency to weight or pack the land. I have often seen the soil harder where a roller had pressed the wet soil than it would have been had nothing been done.

Nor is this wet land in fit condition to be even stirred with an ordinary cultivator. Furthermore with the

ordinary cultivator, the work cannot be done rapidly enough to meet requirements, as frequently there is but a day or two intervening between the time when the work must be done to avoid injury and when the soil will permit getting upon it.

The young seedlings should not be delayed in getting their leaves to the sun and air as quickly as possible, if the plant is to do its very best thereafter. If the young seedling plant is allowed to remain just under the crust for from one to many days it becomes curled and is thus weakened, which has much the same effect upon the vitality of the plant and in the consequent yield of the crop as deep planting of the seed. There are but few instances where if a careful watch of the field is kept that the field may not be worked with this implement before any plants appear on the surface. There need be no fear of working the land until it is thoroughly mulched, as long as one can lift the crust without disturbing the seedlings, in fact, do not delay the work should a few plants appear, as you will destroy but few of them and relieve many.

Every beet grower should keep an especially careful watch of his beet field from the time the seed is planted until the plants attain four leaves, for this period is the most critical one with the crop.

It is not possible in an article of this kind to give instructions as to how each and every condition may be met in the best way, we can consider only those conditions that most generally prevail. There are many instances that require modified methods, and when such is the case the fieldman should at once be consulted, for he is meeting these problems every day from many different angles while the farmer sees them from but one.

The harrow for this purpose should be light and constructed so that the teeth may be tilted. The teeth so placed in the frame that every inch of top soil is broken.

For small fields this harrow can be made very cheaply by taking three 2x4's twelve feet long and making a frame of them by placing them about 1 foot apart. Into this frame may be driven 80 penny nails at an angle of 45 degrees, spaced 6 inches apart on the frame in such a way that the teeth cut the soil 2 inches apart. A more serviceable one, consisting of two sections, each section having four hardwood bars 2x2½ inches, 5 feet long, placing 3-8 harrow teeth in them at intervals of 7 inches, and alternating with each other so as to properly cut the soil, may be made by a blacksmith. These bars should be placed about nine inches apart and be held together with the same irons as an iron harrow, so that the harrow may be tilted at any angle according to the severity of the crust. This implement can be used for any purpose for which a harrow is needed, and is often serviceable in preparing a good seed bed for crops of any kind.

I wish to especially urge all beet growers to provide themselves with such an implement, for taking into consideration the rapidity with which the work may be done, the assurance that no unnecessary packing will be given the soil, that the crust is lifted from the little plants rather than pressed upon them, that all the soil is cultivated in a most efficient manner, and that by the very nature of the work warmth and air are admitted to the soil rather than retarded, this implement is especially efficient and desirable for each beet grower.

We will furnish, this year, 18 pounds of seed per acre, if desired. Owing to the scarcity of sacks required for the beet seed which will be grown this year, we will charge your account with 70c for each beet seed bag furnished with your seed, and 60c for each alfalfa meal bag. These bags will be credited to you at corresponding amounts when returned. Please keep them in as good condition as possible.

Black Root

A. C. Maxson

LACK-ROOT is a disease caused by a combination of unfavorable soil and climatic conditions in the presence of certain organisms which normally inhabit the soil in greater or less numbers.

Anything which retards the growth of the seedling beets so weakens them that they become an easy prey to these organisms. Beets seldom die from black-root after the second and third pairs of leaves attain a length of an inch or so.

Every year some fields are quite severely damaged by black-root. The owners of such fields become discouraged and consider plowing up the crop and either replanting or planting some other crop.

This year, with a probable shortage in sugar beet acreage, a none too large supply of beet seed in the country and a world shortage in sugar, the reasons for delaying the destruction of what appears to be a poor stand are two fold.

In case black-root is destroying the plants, do all in your power to improve the conditions for growth. Whether you should roll, cultivate, irrigate, or block and thin will depend upon the condition of the soil and the size of the plants. Nothing helps beets more than blocking and thinning where the plants are large enough.

Don't put off working your beets waiting for the plants

to die, for the longer you delay the longer the plants are going to continue to die.

Give the young beets a chance; do the best you can by the stand you have and you will be surprised at the harvest.

Did you ever stop to think that when the beets are only an inch or so tall that a space of two or three feet in the row looks many times worse than it does during July or August. Before destroying a stand of beets measure off 100 feet of row and count the skips over 18 inches.

For example, we will suppose that there are 10 spaces of over 18 inches in the 100 feet and that the total length of these is 240 inches or 20 feet. This means that you have 80 feet or 8-10 of the field with a stand better than 18 inches.

Repeatedly we have secured as good a yield of beets with a 17 or 18-inch stand as with beets 10 to 12 inches apart in the row.

In some territories the normal stand over large areas is over 20 inches and good yields of beets result, too.

But supposing we find that the total length of the skips over 18 inches in length is 25 feet. Then we have but 3-4 of the field with a stand better than 18 inches. This means a beet every two feet on the average or a 50% stand if the beets in the field are not closer than 18 inches which is the farthest possible distance between beets according to one measure. However, the beets in all probability really stand much closer than 18 inches where there are plants which means that our stand is better than 50% of a perfect 12-inch stand.

The Farmer's Responsibility on the Labor Question

H. H. Simpson
County Agriculturist

E hear numerous complaints about unjust treatment of labor by some farmers. We also hear as many complaints from farmers about incompetent labor. Now, we realize that a great many of these (both kinds) come from "chronic kickers," but we also realize that in some there is a great deal of truth and they relate conditions that could and should be remedied. Two wrongs never make a right, and because a farmer gets hold of an incompetent hand or has been unjustly treated by a hand, this does not warrant him in mistreating his next hand.

We cannot prophesy at this time just how short farm labor will be. In our community at present there seems to be plenty, but of course this may change as harvest time approaches and all farming operations in all parts of the country are in full swing. We do not know that there is much less labor available for farms than there has been in the past, and our duty is not to drive labor away or antagonize it, but to hold it for our needs when the more serious time comes. This can be done by keeping it satisfied.

Some farmers have objected to the scale of wages adopted for northern Colorado as published in the last Farmers' Exchange bulletin. They claim they cannot afford to pay these prices. This is undoubtedly true of a great many, but you must realize that in order to hold labor and have it available for you an understanding must be made according to the general conditions that not only exist throughout this section but also according to conditions

in the neighboring counties and adjoining states. Idaho and other adjoining states had already made recommendations on wage scales and some farmers in sections of northern Colorado had already hired men for salaries as high as $90 and $100 per month. The scale here was made after a careful perusal of all these conditions, and was made by farmers and farmer representatives from the various counties. In our own case your labor committees of the Farm Bureau represented Boulder county and its own conclusion was reached after consulting a great many farmers and getting their views.

The scale recommended is for experienced help and it should be understood that inexperiencel labor, labor not physically able to do the average amount of work, boys, and help for light work, should not expect to receive the full wage.

Now a word as to the Labor Exchange. This is conducted free and is merely an organized effort to serve you by listing all available labor in the community. It is yours and its efficiency depends upon your co-operation. We have asked farmers to notify us ahead when they want labor; we have asked them to come for labor on Mondays if possible; we have asked them to notify us whether they hire a man whom we have sent them or whom we have referred them to. So far, very few pay any attention to these requests, and consequently some are undoubtedly disappointed because they do not get quicker action. The other day a farmer who had asked us to send him help, called up one of the Exchanges and after receiving information about a certain man, told the Exchange to send the man out so he could talk to him. Accordingly this man was directed to the farm which he had to reach by railroad. Upon arriving he found the farmer had already hired a man and did not need help. It is needless to say this is unjust.

Needless to say, there are some on our lists who are incompetent and unreliable, while on the other hand there has been and is now some very efficient help available. On

the whole, the laborers are more appreciative of this Exchange service and co-operate better than farmers.

This labor Exchange is well organized and a number of busy men over Boulder county are giving their time to this in order to help out. Now you farmers, who are receiving the benefit of this service, should appreciate the help by giving us your fullest co-operation. Last year this service supplied over 500 men. You, who are looking for help have a responsibility and should be willing to meet it.

Reclaiming Alkalied and Seeped Land

E. B. House

(From Colorado Agricultural College Bulletin)

A great deal of drainage is being done in Colorado at this time. Most of the drainage is to relieve the wet and seeped condition of small patches of ground on individual farms that have been water-logged on account of the irrigation of adjoining land.

Many times these seeped areas have become badly alkalied, and after the drain system has been installed, and the ground has dried out, the farmer is disappointed in finding that the soil does not produce as well as it did before it became seeped. This may be caused by the condition of the soil as far as tilth is concerned, or it may be due to the presence of alkali in the soil. In either case it will be well to give this piece of ground a copious irrigation sometime after the drain has been installed. This will wash out the alkali which has collected at the surface, carry it down into the soil and wash considerable of it away through the drain. If the soil has been water-logged so long that the soil structure has broken down the only thing that will restore the tilth is cultivation and vegetation, so in either event it will be a case of two or three years before the soil is back to normal once more. It should be as good or better than it ever was before.

Fighting Weeds

H. T. Delp

A WEED is any plant which is out of place. It is a parasite on our crop yields which drives the eagles from our bank account and ruins our farms. The tactics of the weed are worked day and night and persistently pursues a man's only hopes for success on the farm, good clean crops. The weed accomplishes its end by working its evil above the soil, in the soil and on the market. Its effect is both temporary and permanent.

Any plant, whether it be a wild plant or a cultivated one may become a weed in the crop we are attempting to grow. Oats, either wild or tame, may so speckle our wheat fields that we are ashamed to be the owner. Dodder in the alfalfa may ruin the stand, decrease the yield and practically prohibit a respectable job of harvesting. All kinds of weeds may rob our corn, beets and other crops of their own daily food thereby hindering their growth so they are unable to produce the good yield which was once hoped for.

Weeds take the only food in the soil from our crops. They not only retard, hamper and finally entirely check the growth of the crops this year, but the valuable plant food they take from the soil is gone forever, and worse still, they grow and multiply their army to come back with renewed vigor to attack our crops next year unless we take preventative steps while they are in the preventing form, that is, growing above the ground. Weeds in general are vigorous and persistent or they could not crowd out our crops.

Weeds drain the soil of valuable water which belongs to our crops. So important is this fact in crop production in parts of the U. S. that the all-important purpose of cultivation is said to be weed killing. Weeds are always on hand when plants are striving and suffering for water and they

get their share of what is to be had. They require just as much water to produce a pound of dry matter as does a valuable field crop, but the farmer receives nothing in return for his plant food and water, except disappointment.

Then when the crop is threshed and hauled to the market in the fall it is quite a disappointment, a slight disgrace and oft times a great financial loss when the elevator man gives a nice dockage for foreign seed and damaged or shrunken grain. The value of the grain for seed is lowered or entirely lost.

Weeds often shade the young growing crops and deprive the little plant of the sunlight so essential to sturdy growth. Weeds take up valuable space in the field and work many other evils. In fact the only good worthy of mention which I think of is the organic matter added to the soil when a crop of weeds is plowed under in preparing a seed bed. But even then we are planting another crop of weeds to attack our following crops.

We can easily see what an important enemy we have in the weed, so it is up to us to fight it with all our forces. In the first place we should watch our seed to see that we do not carry additional weeds on our farm. We must plow early and deep. The harrow and disk must be used frequently and thoroughly when the small weeds begin to show above ground and before our crops sprout up far. It is then we can kill a dozen weeds at one stroke where we could only kill one weed later in the season.

Rotation and cultivation is a fine combination of forces in fighting weeds.

When planning tactics for weed fighting in this part of the country one cannot find a better means of attack, without a special and expensive means, than to grow sugar beets. Their field requirements are just naturally opposed to the growth of weeds and when beets are tended properly one has the weed problem minimized for the present and future. Each year the weed worry should grow less if we practice a rotation having in it beets as the money and cultivated crop. Let us not cry over spilt milk but put our shoulder to the wheel and push.

War Time

J. F. Jarrell

CUSTOM seems to have gotten a strangle hold on a great number of people. We get in the habit of doing a thing by rule and unless it becomes stylish to do so nothing can change our methods.

We have our little rules of etiquette by which we manage to make ourselves, as well as others, miserable, in which state we are nearly all the time in an apologetic attitude, trying to excuse ourselves because we think that perhaps we have offended some one because we did not appear to agree with them on some subject. Or perhaps we feel as though we were not quite diplomatic enough at such and such a time.

Custom has in the past made us get up and go to work at 8 o'clock, which all of us thought was the proper thing to do, at the same time the people a few miles east of Colorado thought it was proper to get up and go to work at 7 o'clock, according to mountain time and at 9 o'clock according to the time in style a few miles east of them. Our clock time goes awry as we move over the face of the earth and at certain points, as we travel east or west we are required to take out our old Waterbury and screw it either up or back, depending on the direction we are going. A ruling of which we are all familiar has been adopted as a war measure to allow of a more effectual use of daylight instead of using so much artificial light. This action appears to move this section eastward as it does all sections where the ruling takes effect. We town folks have adjusted ourselves to the new conditions much more easily than the country folks have, because we get up by an alarm clock, while they have been in the habit of getting up by the crow of the trusty cock who made his announce-

ments exactly on the dot at 4 a. m., which is an hour late these days. The farmer is a busy man and always has been. It makes no difference whether he arises by an alarm of animal or mechanical origin, he gets up before daylight and goes bobbing around with his lantern attending to the chores and again at night the chores are done by the rays of the same old lantern which is as much a part of his equipment as his shirt or trousers. The farmer is in most cases limited only by his endurance when a day's work is considered. He does not know anything about an eight-hour law or any other citified customs which would cause his work to go undone. War time does not affect the farmer unless he decides to come to town or has to catch a train, in which case if he wants to be in style he has to screw his old timepiece into the proper adjustment which says to the sun: "I too am in style." "Man has said that 7 o'clock is 8 o'clock and so it is."

Meteorological Report

FOR MARCH 1917 AND 1918

Experimental Department

Temperatures	1918	1917
Mean Maximum	60.97°	44.60°
Mean Minimum	27.26°	20.40°
Monthly Mean	44.11°	32.50°
Departure from Normal	+5.71°	—4.60°
Maximum	73.00° on 26th	75.00° on 28th
Minimum	12.00° on 4th	—10.00° on 3rd
Precipitation in Inches:		
To Date	2.28	1.92
For Month	0.73	1.23
Greatest in 24 hours	0.53 on 28th	0.58 on 11th
Departure from Normal	—0.25	+0.24
Number of Days:		
Clear	20	14
Partly cloudy	9	7
Cloudy	2	10

The Battle of the Beet Field

E. H. Huelskemper

HE call has been sounded; action has started! Trenches have been made and the seed dropped in. The seed has been planted. No one knows exactly how many, but we expect great things of them. Our support is essential and drives have been started and ended. Our drive is in the fields aboard a four-row cultivator.

Pacifists' propaganda---cold soil, clods and crusted fields ---may discourage growth. They must be overcome (steam) roller methods are to be used if necessary to accomplish our end. In spite of discouragement---to growth ---our seed will come up and "over the top" of the ground. Moral support is needed but action counts for more toward growth.

The battlefield is strange to our soldiers; the seed has never been there. As with an army in strange lands difficulties are met and must be overcome. The base of supplies, our soil, is well established. Food has been stored--- by manure and rotation. Weeds, like spies, crop out in all places and do all possible damage. "Cold steel," in the shape of hoe and cultivator are needed to get rid of them. "Depth charges" with bull-tongue and duckfeet must be sent down to ward off subsoil attacks of black root and disease fungi which, like submarines and mines, are everywhere in our fields. "Mine sweepers," knives on the tool-bar, must help keep the rows clear of wreckage and stray alien plants.

"Deadly gas attacks," strong winds from the northwest, must be met with effective barriers made by the use of the cultivator. A "gas mask," a mulch of fine soil is needed at all times. "Caterpillar tanks" in the shape of cutworms, may effectively be met with the "Green of Paris" disguised with sweetened tan-colored bran. "Communication trenches," burrows of beetles and worms, must be broken up. The cultivator does it. "Hordes of flying enemies," grasshoppers, webworms and root lice, must be

destroyed. "Liquid defenses," sprays and irrigation answer the purpose.

The field of activities is restricted---acres are given to alfalfa and cereals, preparing ground in the years to come for the battles of beet fields. The object to accomplish is larger than ever. All nations are calling for sugar. The battle must be fought most effectively to bring permanent peace; a sixteen-ton crop is the lowest limit.

Victory is proclaimed! The battle of the beet field is won. The unfit were thinned out; the fittest survived. They grew fat from the land---made eighteen tons to the acre. The first line of defenses, the original drill trenches, have been covered. The battered but serviceable implements of warfare, in the battle of the beet fields, the cultivator hoe and shovel, have resumed their sheltered places in the barn and tool shed ready to launch once more into other battles as memorable as this Battle of the Beet Field.

Farmers Should Keep Books

J. A. Decker

(From "Farmers Exchange Bulletin")

IF our farmers would get in the habit of keeping a set of books, showing the cost of producing the products of their farms, and the amount they get for products they would have more definite and satisfactory knowledge of how much money they are making or losing in the business of farming.

The average farmer is disposed to look upon farming not as a business, but as a sort of hit and miss occupation that does not require business methods. Yet these same farmers would say that the man engaged in buying and selling the products of the farm was a poor business man if he did not keep a set of books.

The great world war now being waged is fast changing our business and social conditions. The great question

now is, not how prosperous are the manufacturing industries and the mercantile institutions of the world, but how much food and raw material can the tillers of the soil produce. Unless the farming business of the U. S. is able to produce a sufficient amount of food for our boys who are fighting for us, and also supply and help out our associates on the other side of the ocean, the war will be lost to us.

Therefore, it has become necessary that NOW our farmers apply business methods to their line of business and keep a strict account of their expenses and products so that they may direct their energies to such branches of farming as will produce the best results. Then the farmer for his own and personal benefit should keep a set of books so that when an agent for the United States calls upon him to fill out a schedule of his income, it can be done intelligently and accurately and thereby lessen the chance of an arbitrary valuation being made and a possibility of an unjust tax being collected.

I sincerely hope that our farmers will see the benefits to be derived by keeping an accurate account of their business and in order to encourage and develop the habit, I would suggest that community clubs be formed of say, six or more farmers and that they meet once a month or oftener and compare notes, thereby creating an interest in the bookkeeping department of their business.

Instruction books can be had.

Editor's Note---Why not act on Mr. Decker's suggestion and form a Bookkeeping club? We have persuaded Mr. Decker to agree to meet with a dozen or eighteen farmers once a month for two or three months on Saturday afternoon from 2 to 4 o'clock in Longmont to examine the books and correct any mistakes, and again at the end of the year to see that each member properly close his books. Farmers desiring to join this club can give their names to County Agent H. H. Simpson, or to Mr. J. A. Decker, whose 'phone number is Longmont 270j. For the Boulder end of the county, like arrangements can be made if the farmers there desire to form a second club.

Realizing War Responsibilities

(From "Hoard's Dairyman")

IF the war is lost by America and its allies it will be the fault of the men, women and the young people of the United States to whom the war has not, as yet, become a really serious question."

Dean Eugene G. Davenport, of the University of Illinois, made that blunt and intentionally disturbing statement at a meeting held at Janesville, Wis., on April 5th under the direction of a committee of milk producers and distributors.

He was one of the half dozen men called to Washington recently for a conference with the authorities of the United States Department of Agriculture and the Food Administration concerning certain matters which need to be brought to the special attention of the public at this particular time.

In the course of his address Dean Davenport outlined the production program which agricultural leaders feel should be adopted in order that America may do its best in supplying its armies and allies. He briefly reviewed his experiences on the commission which was appointed to establish equitable prices for milk in Chicago, as many shippers to the Chicago market live in the vicinity of Janesville and Beloit.

Following is a brief summary of the points covered by Dean Davenport. They were intended to reflect as nearly as possible the attitude of the Department of Agriculture and of the Food Administration concerning the civilian side of the war situation.

Reconstructing Our Lives

"If the war is lost to the allies, it will be the fault of the civil population of the United States.

"It will not be the fault of the allied armies. It will not

be the fault of the people of England, France, or Italy, nor yet of Canada.

"It will be the fault of the men, women, and the young people of the United States with whom the war has not as yet become a really serious question. It may as well be understood at once that this war cannot be fought as a side issue nor as an extra. If Americans insist upon living as they have always lived, denying themselves nothing but a few of the luxuries, then Germany will win the war and America will pay taxes to the kaiser. The supposition that the war is to be a long one is not a fact to be counted on. It may be ended very quickly and, if so, it will be a victory for the Central Powers. The smug satisfaction of the American people, assuming as they do that the allies are certain to win, is the greatest danger at the present juncture and, as long as that danger lasts, the issues of the war are as clear cut in the Mississippi Valley as they are in the trenches of France.

"We are not in line to win this war until we entirely reconstruct the outlook of our lives. In England, France, and Italy, every man, every woman, and every child over fourteen years of age performs every act with reference to its bearing upon the winning of the war, and Americans must do the same. Unless the American citizen, his wife, his son, and his daughter are willing to entirely reconstruct their object in life, the chances are more than ever that the war will be lost because the entire man, woman, and child power of the Central Empire is a part of an autocratic machine with but one purpose in view, which is to win this war and dominate the earth. It is impossible to successfully combat this kind of co-operation unless it is met by an equal devotion to the cause at issue.

"By reconstructing our lives I mean that we must cease to live for self.. Men and women cannot now live for pleasure, for profit, nor for personal advantage. If we are not willing to surrender the personal outlook for a few months, we shall certainly surrender it for all time to a government which believes and teaches that the individ-

ual has no rights, only duties to the governing class.

"What is the test of this reconstruction of our lives? Every now and then a farmer says that if he could make more money by raising wheat than by raising corn, he would be willing to do it, but, as long as corn is higher in the market than the government price of wheat, he sees no reason why he should increase his wheat acreage. Is this the argument of the soldier who has given up his prospects in life, left his family, lives in mud and filth day after day, and risks his life every time he is ordered over the top? In the face of all the facts, any man who sits down with paper and pencil and coldly calculates whether he can make more money by raising this or raising that, than by raising the things that are most needed, is either ignorant of the conditions, or a traitor and a coward at heart. In either case he is harddly worth dying for. After the facts have been fairly put up to a democracy, if then it is still so utterly engrossed in selfishness as to have lost its love of country, it is not fit for democracy.

"This is what is meant by reconstructing our lives while the war lasts. Farmers must produce, first of all, those things which are most needed, regardless of price. While farming as a whole must pay, and will pay, and while the government will do everything in its power to see that producers have a profit, yet it is beyond the power of any government to insure an equal profit in all things just as it is impossible for the government to insure that every soldier who goes to the front will run no risk of life or limb. This war is a losing game to everybody, except possibly a few pirates who intend to feed off the misery of others. There is no crime in the calendar which is the equal to this, and for such men there is no punishment sufficiently severe.

"To reconstruct our lives under present emergencies means that the women of the United States must cut out confection, as the French have long been compelled to do; that our young ladies must forego the extremely high

shoes that never before ruled in the fashions of the world. Leather is needed now for something besides display. If our women are not willing to do these things, then they will one day suffer as the women of Belgium and France have suffered. Over there the women work under task masters in the trenches and the mines. They are actually pulling plows in the fields by ropes slung over the shoulders, and who are we to live lives of pleasure and of profit when the world is weltering in its own blood?"

Price Control

"The unthinking man does now exactly what farmers have always done---namely, holds his product providing a higher price seems probable. Bills before congress looking to $2.50 wheat check shipments which are sorely needed. If the army is to resist the great drive there should be no agitation in the price of wheat at this time. Let every man who owns a bushel of wheat or a sack of flour understand that it is more precious just now for the winning of this war than is ten times its value in money. Correspondents writing to our colleges of agriculture frequently express the belief that the government has done them damage in interfering with the price of wheat, saying that if the Food Administration had left the matter alone, the farmers would have had $3 wheat and therefore a greater supply would have been forthcoming.

"Three-dollar wheat! What does three-dollar wheat mean? It means three times the pre-war prices and it means a prohibitive price for bread to the poor. Moreover, it probably would mean food riots in our great cities, and no sane man wants food riots now in the very darkest days of the greatest war in history. There never was any such thing as three-dollar wheat except in the dangerous days of indiscreet buying by the allies a year ago. Those who are best informed insist that if prices had not been to some extent influenced, we would have had 30-cent sugar, which would have meant revolution, and thirty-dollar flour, which would also have meant food riots.

"Every country at war, excepting ours, is on the bread-ticket basis, and unless the people respond better than they have yet responded, this country will also be there very shortly. While some dealers respond to all that is asked of them, others hoard without conscience. Within the last few days twenty thousand barrels of flour have been found in an eastern city. There are evidently men in America who are willing not only to gamble with the lives of women and children, but also with the very existence of the government that gives them protection.

" 'Business as usual--no! The man who adopts the slogan, 'Business as usual' is a traitor to his country whether he knows it or not. There is no such thing as business as usual. Everything is unusual now. Some kinds of business will be enlarged and others will be curtailed or cut out, as they ought to be.

"Why should diners in our hotels and restaurants be entertained by orchestras of perfectly able-bodied men while the country is suffering for wheat, for coal, for steel, for the very materials necessary to the winning of the war? This is a question of labor, not of profit. No man has a right to expand his business now unless that business is essential to the winning of the war and, when it is, he should expand it to the utmost on the basis of normal profits before the war. This world war is not a grab game. It is not a case of killing the goose that lays the golden egg for the sake of dividing the feathers; it is a case of supporting Uncle Sam in the hardest job of his life.

Transportation

"War upsets everything; nothing more than transportation. It became necessary to take over the railroads in order to free our system of distribution from the multitude of conflicting laws enacted by the forty-eight different states that make up the nation. There is no better evidence of the crippling effect of recent legislative policy regarding our railroads. We have had the hard-

est winter in history and the most shipping to handle. Seventy per cent of the traffic on the Pennsylvania Central is war traffic. The economizing of transportation therefore is one of the great problems of the immediate future.

The Shipping Situation

"We seem to have passed the most difficult stage of our shipbuilding program. The first task has been to build and equip the yards for building merchant ships. There has been and there is difficulty in the labor situation, and here again the call to labor, as to everyone else, is to play this game while the war lasts and settle differences afterwards.

Spies

"In none of the countries at war is there such an enormous alien population as we have in the United States. The vast bulk of these aliens are loyal to the government under which they came to live and which affords them opportunities such as they could never have had at home. It does afford, however, rare opportunity for the spy and for the man who will sell himself to the service of an enemy country. History shows that there have always been men unworthy to live in respectable society who for a few pieces of silver will betray any trust and any cause which lay within their power to betray. One of our jobs now is to find these men as rapidly as possible and see to it that their power for evil is taken away.

This is Everybody's War

"In brief, this is everybody's war. It is being conducted by the government to be sure, but we are the government. The army will do the fighting, but the army has come from our own firesides. The people and not the army must do the producing and must do the saving. Those who have been taken into military service have been forced to reconstruct their lives. The civil population must do the same, because in order to win this war the entire power of the people will be required."

Beet Top Silage

(From "The Utah Farmer")

ANOTHER highly valuable product of the sugar growing industry is the beet top. The writer has seen hundreds of acres of tops in various beet growing districts handled in the usual careless way and thereby a large part of the real feeding value lost.

In a climate that can be depended upon for a large number of dry days in fall, the tops give excellent returns when piled up and left for the use of cattle and sheep. The new plan with the beet top, however, is one that results in little if any waste and is much more economical than the plan of past years and results in a product that is more highly relished than as compared with the raw tops as they come from the beet.

The Pit Silo

A trench is dug four to five feet deep, twenty to thirty feet wide and long enough to take care of the entire crop of sugar beet tops. The tops are hauled and spread in a pit of this kind, making a solid mass of tops, or a mass made up of alternate layers of tops and of straw.

Beet Top Silage Value

This pit, therefore, is the silo and its contents go through a siloing process which results in a highly palatable feeding material that can be utilized for both sheep and cattle with but little waste. The beet growers tell us that each ton of beets has a by-product amounting to one-half ton of tops. Some feeders have claimed such returns from the siloed tops as to give them a value approximately one-half by weight as compared with alfalfa hay. If this estimate is correct, it means that the return from the sugar beet tops of a heavy crop are almost equivalent to a full year's crop on the same acre of alfalfa hay. If it is granted that it requires three tons of the tops to equal a ton of hay, still the showing is very satisfactory and the relative value of the by-product as compared with the main crop is very great.

Good Roads

(From "Reclamation Record")

Most anyone can build a good piece of road, but it takes more than the ordinary man to maintain a road after it is built.

The following seems to be about right:

Rules for Road Dragging

It is not wise to drag a dry road, for the loosened surface will be sucked up by the traffic, also the wind will blow it away.

Drag the road as soon after every rain as possible, but never when the mud is in such condition as to stick to the drag or when it balls up into pasty ridges when released by the drag toward the center of the road.

If the drag cuts too much, shorten the hitch.

The best results for dragging are obtained only by repeated application.

Maintain at least a 16-foot roadway.

Drag occasionally the full width from ditch to ditch to insure an even surface slope for drainage.

If a dirt road is properly built, the road drag will keep it in good condition.

Use a light drag.

Haul it over the road at an angle so that a small amount of earth is pushed toward the center of the road.

Drive the team at a walk.

Ride on the drag; do not walk.

Begin at one side of the road, returning up the opposite side.

Set the drag at an angle to throw inward toward the center until a rounded crown one-half as many inches high as the width of the roadway in feet is built up.

Never permit a sharp peak to be formed in the center of the roadway. A trip down the center with the drag set straight will prevent this.

Reverse the drag occasionally to throw outward and thus keep from forming an excessively high and dangerous crown.

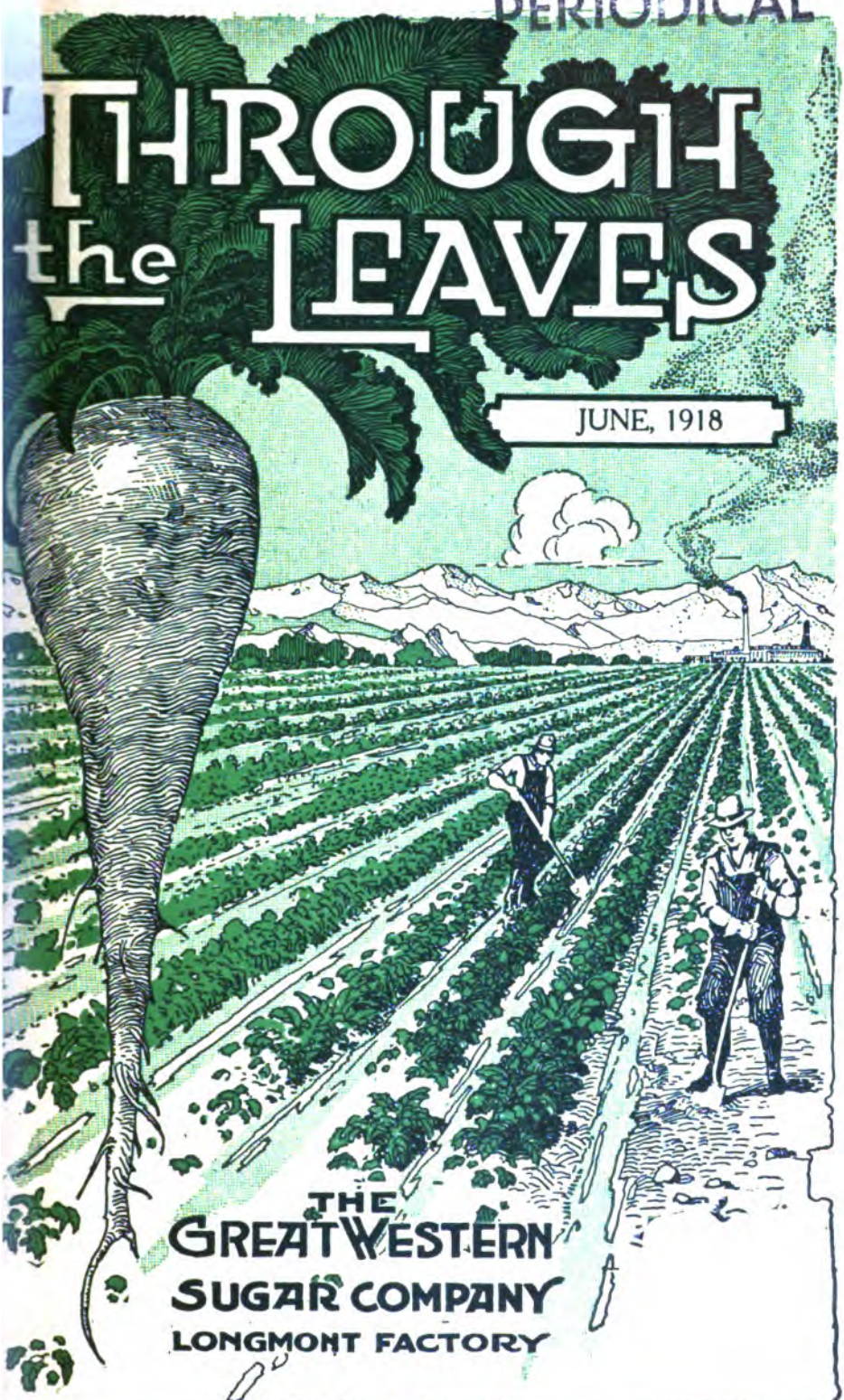
Get the traffic to use the full width of the roadway.

(Farmers Bulletins No. 321 and 597 on Road Drags and How to Use Them, are good.)

PERIODICAL

THROUGH the LEAVES

JUNE, 1918



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THROUGH THE LEAVES

JUNE, 1918

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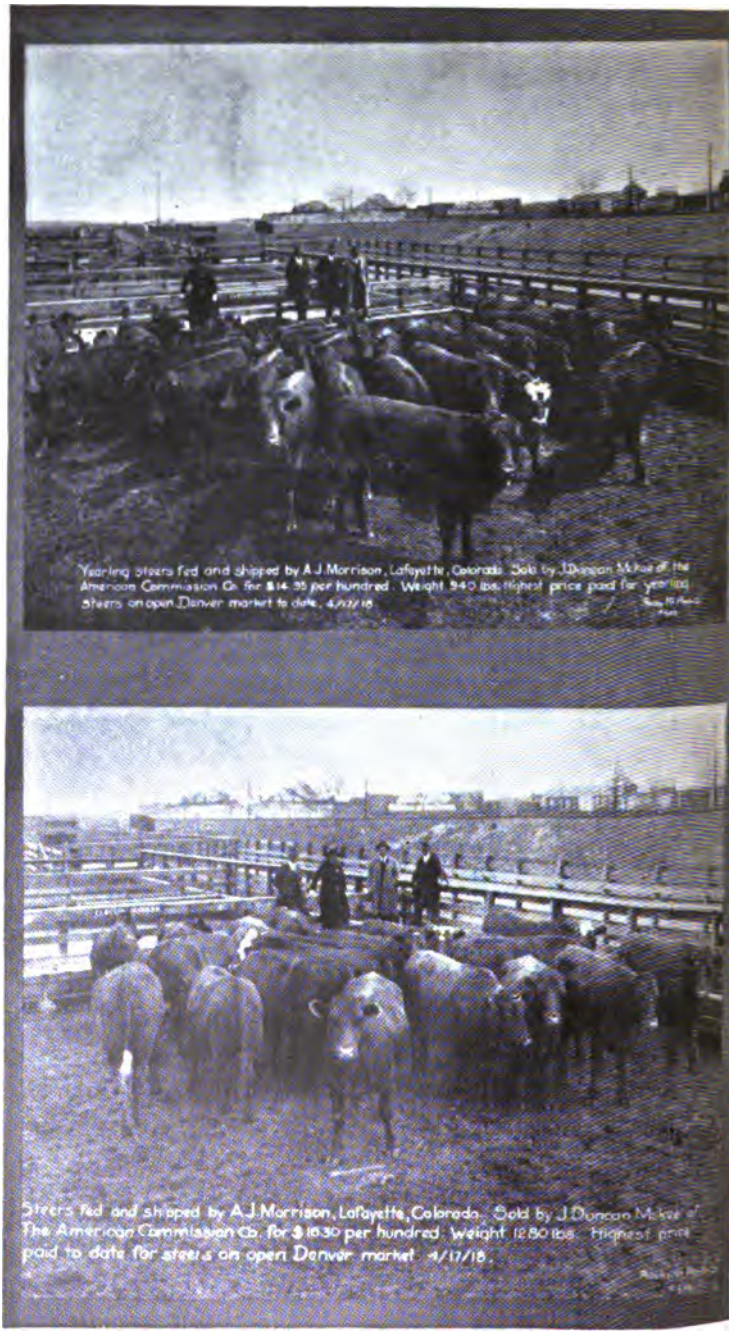
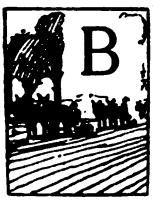

Yearling steers fed and shipped by A.J. Morrison, Lafayette, Colorado. Sold by J. Duncan McKee of the American Commission Co. for $14.35 per hundred. Weight 940 lbs. Highest price paid for yearling steers on open Denver market to date, 4/17/18.
Steers fed and shipped by A.J. Morrison, Lafayette, Colorado. Sold by J. Duncan McKee of The American Commission Co. for $10.30 per hundred. Weight 1280 lbs. Highest price paid to date for steers on open Denver market. 4/17/18.

Fed on Longmont Beet Pulp

NOTES

N. R. McCreery



BY the time this reaches you all our planting will be completed. A large percentage of the acreage is earlier this year than usual and nearly all of this earlier planting is showing an excellent stand. If a good start means anything we should have a banner year for yield.

It is too late now for any acreage increase, but it is possible to make up for a large proportion of the shortage in acreage contracted by better cultivation, irrigation, etc. It would mean only an average of 14½ tons per acre to give us as large a total tonnage as was harvested last year from the larger acreage. This is not impossible at all. In 1906 the Longmont district averaged 14.98 tons per acre. Will you not make a little extra effort to do the necessary work as near the right time as possible?

\+ + +

In the hope of stimulating the hand workers to do better work we have addressed a letter to each contractor. The letter in Spanish to the Mexican workers and in Dutch to the Russian workers. We have also instructed our fieldmen to visit all fields as frequently as possible and we would urge that you also watch the work carefully. The thinning time is a very critical time and much tonnage is made or lost at this time. Good, careful cultivation before the thinners start makes it much easier for them to do you a good job. You should do your part and then you can insist on the workers doing theirs.

\+ + +

The weather has been more or less dry during the past two weeks. Of course this condition may not prevail during June, but if it does, we would urge that you do not

allow the beets to suffer before starting your irrigation. Keep the beets in good healthy growing condition, and with the early start we have this spring we will have the results we all hope for.

+ + +

If any of you should be unfortunate enough to not get a good stand, we ask that you do not plow up your field without having our fieldman look it over. It sometimes happens that a stand looks poor because you do not have a beet every two or three inches in the row, but often there are enough that a 75% or better stand can be blocked out. We consider that a 50% stand of early beets is better than any replanted beets after May 25th.

+ + +

A number of our farmers are taking a little time and trouble to teach some of their Mexican and Russian beet workers to help them with their farm work. The Mexicans are making very good teamsters, and as there are a great many of these people available, the labor problem can be largely solved by the farmers themselves if they will be willing to take a little time for the coaching of this untrained help.

+ + +

Regarding Pheasants

With the demand that is being made upon all beet growers for increased sugar supply, it is a sin to allow the pheasants to destroy any of your beet plants.

As most of you know, the law allows you to obtain a permit to kill these birds if they are damaging your crop. Our fieldmen can supply you with the necessary form of application.

The following two sections of the Act "Concerning Pheasants and the Killing and Trapping Thereof" will be of interest to you:

"Section 1. Pheasants, which are destroying crops of grain, vegetables or fruit, may be killed or trapped by the owner, tenant or lessee of the land upon which

such destruction is taking place, providing said owner, tenant or lessee, first secures a permit as hereinafter provided, from the State Game and Fish Commissioner.

"Section 2. The State Game and Fish Commissioner shall issue permits for the killing or trapping of pheasants, to the owner, tenant or lessee of land, upon which it is clearly shown that pheasants are damaging crops, said permit to be issued under such rules and regulations, and to carry such restrictions as the State Game and Fish Commissioner shall prescribe; provided, however, that no birds thus killed or trapped shall be placed upon the market or offered for sale."

We do not like to see these birds wantonly destroyed, but we do not believe any one is justified in allowing any of their crops to be destroyed.

Meteorological Report

Experimental Department
FOR APRIL 1917 AND 1918

Temperatures	**1918**	**1917**
Mean Maximum	55.6°	56.3°
Mean Minimum	25.6°	29.6°
Monthly Mean	40.6°	43.9°
Departure from Normal	—7.1°	—4.2°
Maximum	70.0° on 25th	77.0° on 22nd
Minimum	13.0° on 4th	19.0° on 7th
Precipitation in Inches:		
To Date	5.34	3.28
For Month	3.06	1.36
Greatest in 24 hours	1.70 on 14th	0.13 on 18th
Departure from Normal	+1.11	—0.52
Number of Days:		
Clear	3	3
Partly Cloudy	19	18
Cloudy	8	9

Jumping at Conclusions

A. C. Maxson

THE success of a doctor depends very largely upon his ability to correctly diagnose the cases he is called upon to treat. The success of a farmer likewise often depends upon his ability to determine the real cause of his troubles. In order to correctly diagnose a trouble both the doctor and the farmer must have a thorough knowledge of the symptoms associated with each trouble. This knowledge alone is not enough, however. Coupled with it must be a good supply of plain horse sense, good judgment and patience.

Many troubles have certain symptoms in common. For example, a dead plant here and there in a beet field immediately suggests cut worms to most people. However, wire worms and white grubs cause plants to die in the same way and unless we examine the plant below the ground and in the case of wire worms and grubs locate the offender, we cannot say with certainty which of the three insects is responsible for the injury.

If we jump at conclusions we may waste valuable time and money in an attempt to kill cut worms when wire worms or grubs are doing the damage. Again if we jump at conclusions and do not hit it correctly, we are not in a position to prevent the same trouble causing serious loss another season.

Recently an interesting case of jumping at conclusions came to the attention of the writer. A certain farmer had a field of grain which was being damaged by the wheat stem maggots. Near by was a field of barley which was not doing well and the owner believed it was also infested with maggots.

The writer visited this field and could not find a single maggot in the barley. What he did find was this: The

ground was evidently quite soft when planting was done and the greater part of the seed was sown three or four inches deep.

After working in the field some time the writer was able to tell plants from seed which was planted too deeply from seed planted at the proper depth. The former were spindling and sickly in appearance while the latter had broad, strong leaves. The accompanying cut represents two of the plants from deeply and two from properly sown seed.

Planted at proper depth — Planted too deeply

This field of barley certainly presented a discouraging prospect. If the owner was left with the wrong opinion regarding the cause he might suffer in the same way again. Jumping at conclusions might have cost him many dollars in the form of seed another year.

The same thing that is true of the doctor and farmer is true of the Sugar Co. field man. If he jumps at conclusions he may cost the industry many dollars.

Here is an example of what jumping at conclusions might cost a farmer: A certain company field man was called to examine a field of beets which the grower thought was being destroyed by alkali bugs. His reason for thinking so was that there were a number of these insects in the field and some plants had really been killed by them. The field man looked the field over and did not see enough symptoms of alkali bug injury to account for the lack of beets. A thorough examination of the field showed that the seed had been planted two or three inches deep and that many of those plants which did reach

the surface had succumbed to black root because of being weakened in forcing their way through the three inches of wet soil. Many other plants were found just below the surface so crooked and twisted that they had lost their power to penetrate the soil and never would reach the surface.

Jumping at the conclusion that the alkali bugs were the cause of the injury would not prevent the grower from making the same mistake again.

Before deciding that "this, that, or the other" is the cause of your loss, study the conditions carefully. Learn the real cause and thus keep from losing in the same way again.

Beet Thinning

F. M. Baker

As our planting is practically completed, we want to call your attention to a few matters in regard to thinning. I think that we all agree that the early thinned beets give us the best results and in order to accomplish this we must start our workers as soon as we can. See that they do their work well the first time over and reduce the double beets as much as possible. If your labor tells you they will take them out when they hoe them, insist on its being done the first time over as there will be plenty to take out when they hoe. Doubles removed when hoeing the second time do more damage than most farmers are aware of.

The field men often run against another phase of this matter when trying to get better work done. The labor says that if they do their work well the first two operations some of the farmers will not let them do the hoeing as there is not much to do and the farmer wants to save this expense. This is wrong as it encourages poor work, and as long as the labor has a contract he should be allowed to do the work as better work means more tons.

Conserving Manure in the Sugar Belt of Colorado

H. T. Delp

OVER $562,500 are drained from the farmers of northern Colorado every year in the form of plant food. The loss is a result of improper handling of farm manure which can in a large measure be corrected. This figure representing the losses from 7500 farms is in reality ultra conservative because the market price of nitrogen, phosphorous and potassium before the war was used in computing the value of these losses. The loss of potassium alone means the enormous amount of $1,410,000 when the present war prices of that element is used. However, this prohibitive price has long ago rendered the use of potassium in a fertilizer mixture impracticable. There is no excuse for the careless handling of this valuable plant food found in manure.

Again the figure is not fair and falls short because no account was made of the enormous loss of 109,685 tons of valuable organic matter which accompanies the loss in plant food elements. Neither was sheep and pig manure taken into account which amounts to no small item.

In the territory under discussion there are 7500 farms representing a total acreage of 1,118,000 acres of which 68,337 acres are irrigated. On these farms are 40,350 horses, 77,960 head of cattle and 11,830 brood sows.

Using the above figures as a basis and assuming that a horse produces daily 50 pounds manure, a cow 60 pounds and a sow 7 pounds, we find that the total amount of manure produced by these three classes of live stock in this territory amounts to 1,154,580 tons yearly.

If you lived on the average sized farm of 135 acres with 91 acres irrigated and cropped, you would probably own five or six horses, eleven or twelve head of cattle and one

or two brood sows. This stock would produce around 155 tons of manure each year. Thus six and one-half tons of manure could be applied to each acre of cultivated land every four years, provided the manure was handled to the best advantage. However, this is not what usually happens. Most manure is allowed to deteriorate in quality and quantity before it reaches the fields.

The extent of this loss has been determined from time to time at various places and although the different investigators do not report the same, it is true that they do all agree on tremendous losses in ill-handled manure. Of course we are dealing with manure in lots and around the barn in our discussion of losses so we will assume that 100 tons of our 155 tons were handled around the barn, the 55 tons being dropped directly on the fields.

It is a difficult matter to give the composition of manure because of variations which occur with different classes of animals, feeds and bedding. Just for a reasonable average we will say that one ton of manure contains 500 lbs. of dry matter, 10 lbs. nitrogen, 3 lbs. of phosphorous and 8 lbs. potassium. Using these figures along with those given above on the amount of manure produced we find that the yearly losses in pounds of plant food are 312 lbs. of nitrogen, 62 lbs. phosphorous and 470 lbs of potassium. By setting a valuation of pre-war prices on the elements we find that each farm loses over $75.00 a year in the form of plant food.

Probably the most important source of loss of our manure is due to the lack of absorbing media for the urine, the liquid part of the manure. So many farmers furnish too scant bedding for their stock. The bedding absorbs the liquid manure and holds it in place so that it may be carried to the field. When we consider that the urine in manure is more than twice as rich in nitrogen and over ten times as rich in potassium but falls short in its proportion of phosphorous, it is unnecessary to emphasize the importance of saving this part of the manure. This loss is simply a draining process, not even a leaching effect

so no remedy can be applied except to furnish an absorbing agent.

When feeding lots are used it is best not to disturb the manure until it is spread on the fields, but let it remain packed down. The bedding too, has its fertilizing value. A good average for the amount of plant food recovered from the feed and bedding used in dairy, cattle and sheep feeding is one-third of the organic matter, three-fourths of the nitrogen, three-fourths of the phosphorous and most all of the potassium except that used in milk production. More of the elements are recovered in work stock feeding. This exposes the comparative value of manure and the original plant as a fertilizer. In the old countries the value of saving and protecting manure has long been realized so there we see feeding lots and barns with conveniences for collecting and protecting manure. It is a crime to burn straw when it could not only give its plant food to the soil but also be so valuable in carrying the liquid manure to our fields.

No price has been set on the organic matter lost in our manure because of no commercial price being available. Too much emphasis cannot be laid on the importance of organic matter to our soils. This is the one thing above all others that our soils are in need of. It has been shown by tests that our crops respond much quicker and in a larger measure to organic matter than to any or all of the three main plant food elements. When we know that by careless handling of our manure we lose about ten tons of good organic matter a year, we should then if never before feel the need of protection and care of our manures.

The condition best suited for manure is that it be kept damp without leaching. It should never be allowed to become dry and "fire fang," which is caused by a rapid development of fungi on account of the lack of moisture. Flat piles of manure exposed to the weather where damage is possible is the worst possible condition for it to be in. Too many farms have just this condition existing about their barn lots.

One Reason Why we Irrigate

E. H. Huelskemper

E irrigate in order to supply moisture for growing crops, applying it either while the crop is growing or before it is planted. Sugar beets are irrigated while they are growing.

Plants take their food from the air and from the soil. That taken from the soil must be in a soluble form. It is seldom that any soil is lacking in a sufficient amount of plant food to support the growth of a crop, but very often this plant food is unavailable to the crop. Either it is insoluble in water, or it occurs in combinations with other substances which make it unavailable to the plants. When we add irrigation water we make much soluble food available to the growing plants. In a large measure it is a transportation problem; the plant food is there in the soil, but it cannot reach anywhere where it will do good. Water is the means of getting the food where it can be utilized. The process might be compared with our eating soup. In making the soup we mix a lot of things together in more or less water. When we eat it, it does us good. Some of the things in soup we wouldn't eat if they were not in soup, at least not so readily. Mix the plant food, which is in the soil, with water and the plant uses it; leave out the water and not so much of the plant food is used.

Of course, irrigation water does some more things, such as washing out undesirable materials from the soil, as alkali salts; stimulating bacterial activity, changing the structure of the soil, and other things, but making the plant

food available in a soluble form and keeping the plant tissues from wilting are the important considerations for the irrigator.

Irrigation and drainage must always be considered together. We couldn't live surrounded at all times by soup, neither can a beet live when completely surrounded at all times with water. Some of the excess water must be drained away as it is impossible to apply just the exact amount of irrigation water which is needed to make the food available to the plant.

A great many people irrigate by the calendar; that is, they don't start irrigating until a certain date. That isn't right. The best and only rule to follow is to irrigate when the plants need water. When they need water is most readily seen by the man who is familiar with his soil and with the crop which he has on it.

Often a light rain will cause one to stop irrigating. In most cases this shouldn't be done. Seldom enough rain falls at any one time during the irrigating season to moisten the soil as much or as deeply as an irrigation. The following comparison may illustrate why a rain should not stop an irrigation: We have a board to nail on a fence. We also have a nail, but we lack a hammer with which to drive the nail. Call our field the fence; water a board; a rain storm the nail. We need something to put the rain where it will do some good. Irrigation does this; it drives the rain water down into the soil where it will be used, instead of allowing it to be carried away by the wind.

In the same way, if a rain comes when everything is in readiness for beginning an irrigation, the rain should not cause a delay of a few days. The rain is seldom enough to do any good alone; add some irrigation water to it and the full benefit of the rain water is secured.

Two Things to Bear in Mind

A. C. Maxson

THE first brood of web worms is due about June 20th. Be on the lookout for the moths and eggs about the 10th to 15th. Remember that in order for your efforts to control this pest to give the desired results you must spray early, that is, before the worms are more than a few days old. The sooner the spraying is done after the eggs hatch, the easier the worms are killed and the less damage they will do. Use 3 to 4 pounds of Paris green or 6 to 8 pounds arsenate of lead (paste form) and 100 to 125 gallons of water per acre.

Second. The amount of water which fell between Oct. 1st last and April 15 was 4.96 inches. This compares with the years 1912, 1913 and 1916. Unless we have an unusual season between April 15 and June 25th, we can expect not to exceed 6 inches more water by the later date. This means that with the open weather which prevailed during March and the warm, windy weather of the past weeks the stored moisture in our fields is going to be running low by the last week in June. This in turn means that we must irrigate early if our crops are going to be as large as we desire. Don't follow the calendar but study your crops. As has been stated in another article in this number of Through the Leaves, the plants cannot feed upon soil fertility unless it is in the form of soup. This requires water. The less water you feed your crop the less food it gets to eat. The less it gets to eat the smaller it will be and the smaller each plant the smaller the harvest and the cash returns.

Thinning Beets

J. F. Jarrell

SO much has been said in the past about thinning beets that it might seem to be superfluous to add more.

There are, however, some things which the average farmer may not be posted on which materially affect the yield of his beet crop.

Of course we all know that the most profitable stand is not too wide nor too close a spacing of the beets in the row but some certain spacing is just right to produce the maximum returns from a field of a certain degree of fertility. Our problem is to determine as near as possible just what the spacing should be to produce the highest yield of cash per acre. Experience tells us to space our beets wider on poor soil than we do on rich soil and it also tells us that our cash returns are influenced in proportion to the nearness of the approach to the ideal stand.

Proper supervision is of prime importance during the thinning season. No farmer can afford to relinquish the right to keep his eyes on the thinners and the work they are doing to any person whose only interest in the crop is a certain amount per acre.

There are a few exceptions to the rule, but most contract labor is going to work to the ideal of getting the work done with the least expenditure of muscle. This we call efficiency and there are lots of efficiency experts operating in this field. I believe that I am safe in saying that a farmer should personally supervise the work of thinning in every detail. Of course he will need the willing cooperation of his workers in order to have his orders executed as given.

We will assume that a 12-inch stand is our ideal and

the labor is ready to go to work. The first thing to do is to convey our ideal to the labor by clear concise instruction. This can best be done by a little exercise which will show not only what we want done, but will also show that we know what we are talking about. Thin a row or two and the labor will have you sized up to a "T". The size of the plant left will influence your cash returns materially. The largest beet which is possible to be left is the one to leave and this should be left so there is no doubt about its growth when the thinner leaves it. A blank space will cost you as much to handle as a beet would cost except the hauling of the beets to the dump which we all know is rather of the nature of a pleasure.

Experiments have been run which showed a difference in yield of two tons of beets per acre. In one case the largest beets were left and in the other the smallest beets were left. The advantage was, of course, in favor of the largest beets and at present prices it amounted to the sum of $20.00 per acre.

Be sure your labor has your ideal as his ideal when thinning for you because you are paying him to deliver what you want, not what he may try to deliver. Stay by him and see to it that you are getting what you are paying for. Remember that a beet today is worth 100% more than it was a few years ago.

Check up the work by making frequent counts to see if the stand which you expect is being left and in a growing condition. Discourage the leaving of two or three beets where there should be only one. Twins from sheep are all right, but it is not good practice to grow beets like we do sheep. They cannot separate and go in search of food when needed as they grow up.

It is a known fact that the labor can make or break a farmer and their most destructive work is done at thinning time. So let us not have the work done without the closest personal attention from the man who is the most vitally interested—the farmer himself.

Thinning and Cultivating Beets

Mark Austin
Agricultural Superintendent, Utah-Idaho Sugar Company

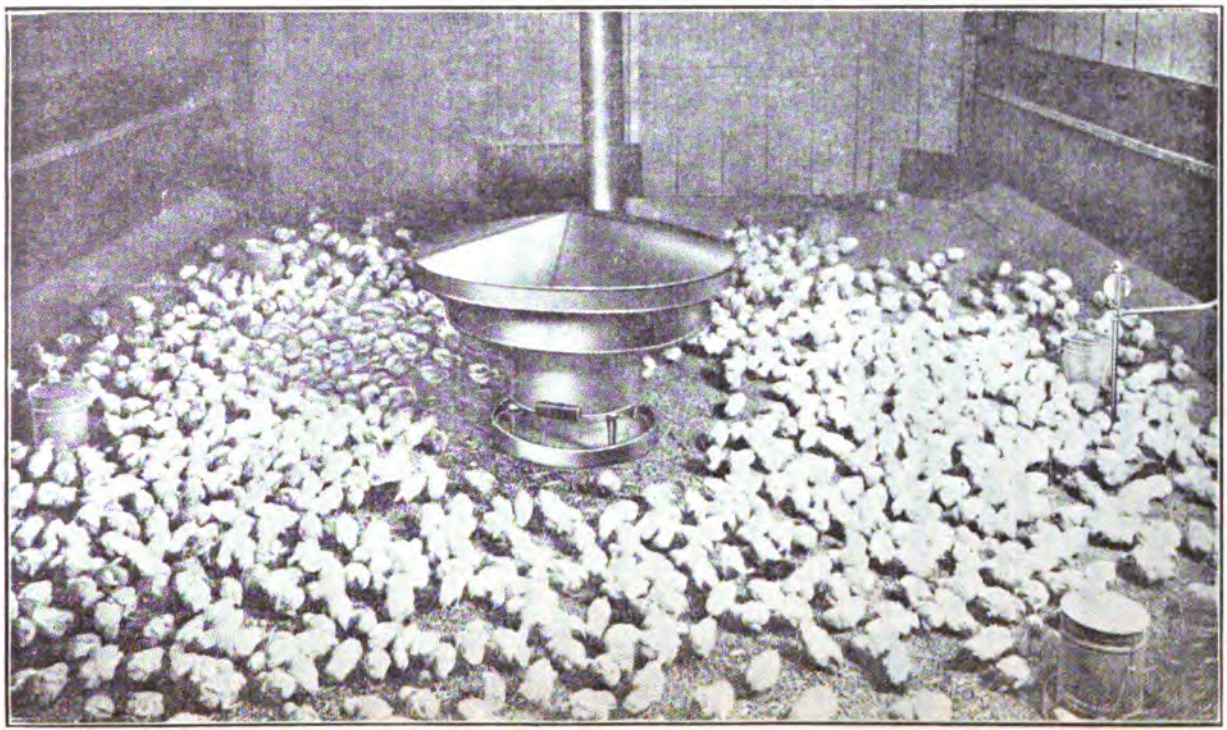
I WANT to congratulate our growers of the Utah-Idaho Sugar company on the splendid work they have done in the preparation of the seed bed, most of which has been prepared in first class shape, and thus the foundation for a good crop has been laid.

Now, I sincerely hope you will be just as prompt and careful with the thinning and see that it is well done. Wherever it is possible leave the largest and healthiest plant, the proper distance apart to suit the condition of the soil. On rich soil closer than on the poor soil, ranging from 10 to 14 inches to suit conditions. Most of our growers have learned by experience the proper distance to get the best results.

Great care should be exercised to see that the plants needed are not destroyed, but left in good condition after thinning. Just a little extra care on the part of the thinner will mean a great deal to the tonnage.

Beets should be well cultivated and if at all weedy it pays to cultivate once or twice before thinning. If the weeds are not killed before thinning, by the time the thinning is done they will have grown so large that it will be difficult to kill them. If not killed they will take a great deal of moisture and strength out of the soil if allowed to grow to any extent. It is a great loss to allow beets to become weedy at any time. Like preparation of the soil if the cultivating and thinning is done at the right time and in the right way it will very naturally increase the tonnage. Now that beets are $10.00 a ton it will pay well to see that the work is done right.

I sincerely hope that our farmers will do as well with thinning and cultivation as in the preparation of the seed bed and then we will be able to have a large crop.



A Glimpse in Mrs. Frank Wadsworth's Brooder House---600 Pure Bred White Leghorn Chicks

Increasing the Efficiency of Farm Labor by Community Cooperation

E. H. Thomson

Of the Office of Farm Management, U. S. Dept. of Agriculture

IN the present world crisis only those efforts should be carried on which have a direct bearing on the successful conduct of the war. These efforts, in the main, are confined to military preparations and the production of food and clothing for our allies and ourselves. The aim on every farm should be to confine all efforts to those crops and live stock which are contributing directly to the food program and to dismiss all possible work which can be postponed until the crisis in food production is safely over.

The most essential farm operations are necessarily the preparation of the land, the planting and the harvesting. It is perfectly evident that facilities for accomplishing this work are much more satisfactory and efficient on some farms than on others within a given community. A plan, therefore, whereby all farmers in a community would consider these necessary operations as a whole for the region, and whereby all would work toward completing these operations before engaging in less essential work, should result in a marked increase in food production.

As an instance of the need for cooperation of the kind here suggested, the following case may be cited. In a group of fourteen farmers situated in a community in one of the best farming regions in the corn belt, where records were kept of every detail of farm work, one year it was found that five men out of the fourteen failed to get all of their corn planted by the last week in May. They had worked as hard and as steadily at that operation as had their neighbors but they were delayed by one

cause or another, such as lack of labor or teams, or were handling a larger acreage than their equipment would allow them to handle satisfactorily. In this same community were three men who completed all their planting operations before the 20th of May, and five others who completed their work by the 25th of May. It is true that these men who finished their planting work early had plenty of other farm work, but none of such great importance as the planting of corn, on which some of their neighbors were engaged for two weeks after they had finished. If all these men had considered that corn planting was a national necessity and had pooled their efforts, all of the corn on all of the farms could have been planted within the most favorable time.

Again, it was found that some of these same men had their corn land prepared much earlier than others and that several days elapsed between preparation and planting, during which their men and teams could have been utilized to excellent advantage by the neighbors who were less fortunate in having the preparation for planting fully made.

When it comes to harvesting, the pooling of community farm interests is even more necessary and beneficial, because on such work the greater efficiency gained through larger crews and larger machines is a most important factor. For instance, in a neighborhood there may be one farm having 150 acres of hay to harvest, surrounded by three farms having 25 to 30 acres each. The present custom is for each man to do his own work. The small farmer has two horses and one mowing machine. He may do his haying with the aid of one man, or of his wife and children; but it takes him the larger part of the haying season to accomplish this work. The same is true of the other small farmers. The farmer with the large haying has to hire extra laborers from outside sources and these, with his larger equipment, do his haying in about the same time as it takes the small farmers, or in a period of from two to three weeks.

By pooling their interests the three small farmers could assist one another and do the haying on each farm in two or three days by reason of more equipment, more teams and more labor, together with the greater efficiency from larger crews in haying operations. In the same way this group of small farmers, having been able to complete their harvest in a much shorter period, would be available to assist the farmer with the large haying, either by hiring to him or by an interchange of work. Such an arrangement would permit all of the harvest work on these four farms to be carried out without hiring additional labor which has been the usual custom in a great many instances.

These are only a few examples of how community effort on the part of farmers can materially increase the efficiency of their available resources. Heretofore this universal interchange of labor on farms has not been common. It has been confined to only a few operations such as threshing and silo filling. It is true that there are disadvantages connected with this interchange of labor in that the crops on one farm may have to be cut a little too early or the harvest may be delayed a little on another. Again, it is difficult to find a number of men who are of one opinion concerning just how the work should be carried out on any particular farm. However, in this great crisis the interests of the individual are secondary and those of the nation, of which each community is a part, are of first consideration.

Wherever such a plan as that suggested can be used it will be particularly advantageous at this time in view of the shortage of workers and the scarcity and high prices of equipment. In short, the plan is nothing more than the use of all men, teams and machinery within a given community so as to gain maximum efficiency on the absolutely essential operations during the critical periods, which at most are of short duration.

Other People's Troubles

THE AMERICAN DAIRYMAN

(This is reprinted from Hoard's Dairyman, April 26. 1918, being a synopsis of an address by Dean Russell of Wisconsin College of Agriculture, and also a member of the Food Administration).

Reduced Consumption vs. Increased Number Dairy Cattle

The result of the entire dairy situation has been to dam up the export outlet, to reduce home consumption, and with this condition we found ourselves on January 1 with 390,000 more dairy cattle in the United States than a year ago and 22% or 1,185,000 more dairy heifers, many of which will come into production this coming summer.

Changed Conditions Require Readjustment of Dairy Policy

The futility of making any permanent, long-continuing policy is evidenced by the changed conditions which the dairy business shows now from last summer. It is still as important as ever that we safeguard the war necessities of the case, but, if shipping facilities cannot possibly be provided, it is futile to stock up supplies indefinitely here in this country. With such a perishable product, conservation requires use, or such measures are worse than useless.

This condition calls for a new alignment and Mr. Hoover authorizes me to say that the Food Administration's policy for the immediate future will be as follows:

Necessity of Reserves

1. It is of the utmost importance that recognition be given to the necessity of accumulating reserves of dairy products capable of being stored without detriment, which will enable the varying needs of our army and navy to be met without any question and also help to provide the necessary fats for the civilian needs of our allies.

Use Fluid Milk Freely

2. The impossibility of utilizing for war needs fluid milk supplies and the absolute necessity of furnishing liberal quantities for the growth and maintenance requirements of our population, together with the abundant supplies which now seem likely, make it highly desirable that the use of this food should not be curtailed. The Food Administration is urging the replacement on the hotel and dining car menus of some of the earlier stringent conservation statements. In this it is meeting with the cordial support of the railroads and hotel managers. Several of the largest hotels in New York have decided to use only butter as shortening in the making of their pastries and fine cooking.

Federal Commissions Have Stabilized City Milk Prices

3. The retail prices of market milk have been greatly stabilized through the findings of the federal milk commissions under Judge Lamb's direction. Every effort has been made to put this business on a solid economic foundation and to secure accurate data as to the actual cost of production and distribution so that a fair profit might be insured both the producer and the distributor, while at the same time guarding the interests of the consumer.

Increased Production Will Present Wider Use

4. With reference to the wider use of manufactured dairy products, it is difficult to formulate at present any very definite policy. If the damming up of the overseas trade continues, it will undoubtedly be necessary to stimulate consumption here in this country, but this turns in large measure on the price. From the national point of view we must have adequate storage stocks, but with an impending surplus it is futile to push for increased consumption on a rising market.

Ice Cream Situation

6. Efforts have been made on the part of manufacturers to reduce the butter fat standards in ice cream from present state standards, which vary from 8% to 14%, to a uniform standard. The effort has been used to make this standard 8% during the war as a conservation meas-

ure. The necessity of this conservation measure under existing conditions does not seem to be so paramount as earlier. Further, it is not the policy of the government to recommend abrogation of existing state statutes except as a war emergency measure which, at the present, does not seem to exist.

7. Much complaint has been made with reference to the limitation of sugar in the manufacture of ice cream. The sugar shortage is still very acute.

General Situation

The dairy situation in America must be preserved at all hazards. This industry differs from other forms of live stock industry in that no production of milk can be secured under two years and a dairy animal does not reach its maximum under five years. Hence, dairy production must be stabilized or serious conditions will develop in the future.

THE AMERICAN BEEF FEEDER

(This is from Breeders' Gazette, March 7, 1918).

I am feeding 300 cattle, and paying $1.50 per bushel for corn. They are good 1,300-pound steers and have been on feed about 100 days (this is Jan. 10). When I try to market them there is but little demand for them for government account, and the price does not warrant feeding them high priced feed. When I try to buy cattle to feed for a later market I come into direct competition with packer buyers buying for government contracts and am unable to buy 900 and 1,000-pound steers at prices that are attractive because the government is contracting that kind of meat. If the making of beef is to be encouraged why should not the government pay enough more for heavy quarters so that the packers would take hold of the heavy cattle and leave the lightweights for feeders? If there should be a sliding scale for the price on government contracts, increasing as the weights increased, it seems to me that it would be a simple solu-

tion of the problem of encouraging the production of beef. The same rule would apply to some extent to other meats.—H. H. C., Hudson, S. D.

Neither the army, navy nor the allied buyers are in the market for any carcass over 600 pounds and do not seem disposed to change their requirements, largely, I think, because the general opinion is that higher weights are not economical. If you will study the price charts, particularly for the last six or seven months, you will be struck by the fact that the extreme type of fat cattle has declined sharply and in general the spread between the top and the bottom is less. That means something more than that the army and navy are not buying; it means that the nation as a whole is buying less of the highly-fed stuff, simply because it is not economical and because it is a peace-time luxury which the nation is not affording in war times. I am afraid that these basic facts are too strong to disturb. Rather, I think, the effort of feeders should be to feed less and develop the type of cattle for which the market is steadiest and best. You will realize that the price which has to be paid is an important element in the foreign buying; it is not a question whether they will pay any price that somebody wants them to pay. They know their business and their own desires well.—J. P. Cotton, U. S. Food Administration.

THE ENGLISH FARMER

(This is an excerpt of the editorial in Vol. 38, No. 2 issue of Experiment Station Record).

At the outset of the war the English farmer's labor and his horses, as well as certain of his products, were largely claimed by the army. This placed him under great disadvantage in even maintaining his usual production. As early as 1915 the army requirements for hay approximated one-fourth of the entire annual production. Farmers were required to make returns as to the stocks on hand and to offer their supplies to avoid having them requisi-

tioned. In 1916 and again in 1917 the Army Council took possession of all hay and of oat and wheat straw, to be held subject to its disposal.

Restrictions were placed by the food controller on the extent to which cereals might be used, including ultimately the prohibition of their use except for purposes of food and seed. License was required for buying or selling these products, and restrictions were placed on the feeding of grains, especially wheat and barley, to live stock and poultry, if suitable for human consumption.

Potatoes were made the subject of numerous orders, growers being required to report monthly as to the estimated quantity in their possession, prices fixed, and a comprehensive scheme worked out for the distribution of seed potatoes. To safeguard the supply of the latter an order was issued forbidding their use for any other purpose and requiring certificates for transfer.

The cultivation of flax having become a military necessity, and the area in flax in Russia and Holland having been substantially reduced, with no dependence to be placed on getting seed from those countries, the Army Council issued an order requiring Irish farmers to save seed of the 1917 crop from at least one-eighth of an acre.

The government took possession of the hop crop of 1917, made the buying and selling of hops subject to permit by the food controller, and required growers to reduce the area of picking to one-half that of 1914 for the duration of the war.

In some sections of England bulb growers were required to take up one quarter of their area and substitute wheat, and also to plant wheat or oats between the rows on another twenty-five per cent of the land left in bulbs.

The entire wool clip of 1916 and 1917 was taken over by the government, price fixed, and holders prohibited from selling to other purchasers.

The regulations have gone so far as to forbid the feeding of game on products suited to human and live stock feeding, and to encourage the killing of certain game and migratory birds by extending the open season, the reduc-

tion of the stock of pheasants, and the destruction of rabbits, hares, rooks, sparrows and rats.

The board is authorized to take possession of any land not being so cultivated as to afford the largest practicable food production, and carry it on to that end, to require occupiers to change their plan of operations regardless of contracts, and to direct the breaking up of grass land for the growth of cultivated crops. It may also take over commons and waste lands, including sporting grounds, tennis courts, bowling greens, etc., and allot these lands to persons who will cultivate them. It practically gives the board control of agricultural land irrespective of its ownership, to be used in its discretion for the benefit of the empire. Failure to comply with directions as to the cultivation or breaking up of land constitutes a serious offense against the defense of the realm regulations.

When Prices are Too High

(From "Successful Farming")

THERE is a vast difference between prices that are high and prices that are too high. After all, prices are merely relative as to whether they are high or low. The real question is how much can be obtained for what a person has to give in exchange. If a man has hogs, horses, butter, wheat, corn, hay or other products of the farm and needs plows, manure spreaders, cultivators, binders, harness or what not, the price of the products he has to sell or the products he must buy are high or low in proportion to the amount of one product required to purchase a given amount of another product. If it takes eight hogs of a given weight to purchase a manure spreader of a certain size and make, wherein is the difference whether the hogs sell for 7 cents a pound and the manure spreader for $75 or the hogs for 14 cents a pound and the spreader for $150.

As a matter of fact, the average price of hogs for the five years preceding our entrance into the war was 7 cents. It took eight two-hundred-pound hogs to buy a manure spreader. With the prices now prevailing, eight two-hundred-pound hogs will sell for enough to buy the same spreader at its increased price, and there will be a surplus of almost $100.

The average price of wheat for the five years before we entered the war was 88 cents. It took ninety bushels to buy an $80 grain drill. Sell ninety bushels of wheat now and you will have more than $60 surplus after purchasing the drill.

The mere fact that it requires more dollars to purchase a given article than it did a few months or years ago, does not prove conclusively that it is more costly. It is only by comparing the cost of one article with the cost of other articles that it is possible to determine whether or not its price has unduly advanced.

There is much complaint of prices being too high or too low. Some of the complaint is justifiable and some of it is not. In the extremely unusual times through which we are passing, it is inevitable that the prices of some commodities should get out of their proper relation to other commodities. In such cases there is good ground for complaint.

There is no better method for determining whether the price for a given article is too high or too low than by comparing it with the price of other articles. If it requires more bushels of corn, wheat or oats, or more hogs or cattle to buy a given article or to hire a certain amount of labor, than it did five years ago, then either the price of the article or the labor has increased too much or the price of the farm products has not increased enough.

By making such comparisons it is possible to detect the commodities whose prices are not in the proper relation to the prices of other commodities. It is not possible to do so by merely considering the number of dollars for which an article is bought or sold.

Successful Feeding with Dry Beet Pulp

The following letter concerning dried beet pulp should be of great interest to our readers who feed beef or dairy cattle:

Longmont, Colo., April 27, 1918.

Mr. N. R. McCreery.

Dear Sir:

I tried the dry pulp to my entire satisfaction. The yearling steers in the picture were fed on it and the two-year-olds finished on it.

I consider it equal for fattening to the corn that could be bought this year.. It is a great saver of both hay and grain.

Nine pounds per head was the most that I could get them to eat. These steers weighed 622 pounds and were bought at $7.85 and sold at $14.95, weighing 942 pounds, making a gain of over two pounds per day.

The two-year-old steers weighed in 900 pounds and were bought at $9.00, and weighed out at 1280, gaining 380 pounds. They sold at $16.30.

These steers were fed pulp and hay, and cottonseed cake ground and mixed with syrup. The last thirty days they got nine pounds of dry pulp and two pounds of ground corn.

The milk cows doubled the flow of milk when fed on dry pulp.

Have stored enough dry pulp to feed the cows during the summer months in place of bran.

Yours truly,

A. J. MORRISON.

A Million Tons of Sugar Used by Manufacturers

Food Administration Survey Shows Industrial Consumption is 25 per cent of Country's Total

(From "Facts About Sugar" April 20, 1918)

AN important survey has been completed recently by the Washington office of the Food Administration's Sugar Division, in connection with its plan for gathering complete statistical data relative to the operation of the American sugar industry in all its branches This report covers the approximate quantities of sugar used annually by the manufacturing industries of the country.

Total Nearly a Million Tons

The figures as given out show that the total annual requirements of the manufacturers, presumably compiled on the basis of the quantities used in 1917, are now equal to 972,125 short tons, or approximately 25 per cent of the present total sugar consumption of the country. In the order of their importance the confectioners lead with requirements of 350,000 tons, or nearly one-third of the total used by all manufacturers; the baking industry is second with 239,000 tons, soft drink producers third with 135,000 tons, and the condensed milk manufacturers fourth with 100,000 tons.

The complete statistics as issued are as follows:

Approximate Quantities of Sugar Used in Various Manufactured Products in the United States

(Compiled by the United States Food Administration, Sugar Division, at Washington, from information received direct from manufacturers.)

	Tons
Confectionery	350,000
Bread	45,000
Crackers	55,000
Sweet doughs	45,000
Pies	47,500
Cakes	37,500
Sundry baker goods	9,000
Chewing gum	15,000
Soft drinks	135,000
Ice cream	64,000
Tobacco	26,000
Soap	900
Brewers	None
Canned vegetables	4,000
Canned fruits---	
Calif., Ore., and Wash.	17,000
Rest of U. S.	9,000
Condensed milk	100,000
Proprietary medicines	6,100
Pharmaceutical preparations	6,125
Total	972,125

First Official Figures

Although from time to time in the past various estimates were made as to the amounts of sugar used by the manufacturers, both collectively and on a comparative basis, no official or accurate figures have been obtainable. The fact that these particular data were not a matter of official record was brought to the attention of the Sugar Division shortly after its organization and, as such figures were considered of great importance in connection with the Food Administration's task of securing adequate supplies and promulgating regulations affecting distribution, this survey was undertaken.

Because of the great number of manufacturers using

sugar in many forms, as well as in both small and large quantities, this survey involved a great amount of detailed investigation and its completion occupied a considerable length of time. The Sugar Division, however, was able to secure the hearty and active co-operation of the manufacturers and thus has been able to make public this week the complete figures.

Injurious Pests

A new and somewhat injurious pest has recently been classified. Its existence has been known for some time, and also the results of its work have been more or less apparent. This is now known to belong to the species Bipedicus antagonisticus. It has largely confined its work to the destruction of the sugar beet crop, though by careful investigation it is found to have a bad effect on nearly all kinds of crops that may be grown in the community where it does its work.

Its habits of living are little known, nor has it been discovered on what it feeds when in the dormant state. It is established beyond a doubt that it is parasitic in its actions. Like most other obnoxious species it is selfish and does not look out for any of its kind, but lives its own life for selfish purposes.

Its method of attack is by a seditious secretion that forms a sort of gas, that has been known to even becloud the minds of human beings with which it may come in contact, and causes the plants attacked to wither away. Needless to say that everyone should be on the lookout for this dangerous pest.

The only remedy so far discovered is to swat it with a paddle or brush that has previously been dipped in melted tar. A few feathers added to the mixture makes for effectiveness.

Concentration of Energy

(From the "Western Farmer")

TO concentrate energy is the tendency of the present day in all lines of business. We see it demonstrated in the building of ships, locomotives, in the manufacture of farm machinery. It is done for the one purpose, that of getting the most work done at the least cost and greater profit.

When a railroad can haul 80 cars of freight with one train crew, due to the power of the engine instead of making up two light trains, the pay of one train crew has been saved. That means profit. When a farmer puts a tractor to use on his farm to supplant a half dozen work horses and thereby saves man and horse labor and does the work more efficiently and at a less cost, he is accomplishing something worth while through the concentration of energy.

Let us view this thing from another angle. Many there are who fail to see that energy can be concentrated to the profit of the farm animals. What is the use of keeping two cows when one can easily produce just as much milk and butter fat as the two put together? What is the use of giving labor feed and stable room to that extra cow? You don't think for a moment of getting two milking machines if one can do the same work.

How about the horses? There are a few big draft horses and countless numbers of small horses kept on the farms. One big drafter has as much muscle as two little horses and will not only do better work, and a good draft mare will raise a better and more valuable colt.

There are breeds of hogs that will make 250 or 300 pounds of growth in eight months from birth. Why? Because they are built on the concentrated plan and soon put money in their owner's pocket. Yet many you will

find who prefer to feed the nondescript hog that eats lots and fattens slowly.

The same is true of sheep, chickens and beef cattle. There are types suited to special purposes. These types produce results at less cost than the scrub or the types unsuited to the particular end sought. Just as the manure spreader is more efficient in every way than the hand method of spreading, so is the true dairy type more economical than the beef type for milk production.

Did you ever stop to think that there is enough power in the wind that blows over every farm to run all the machinery, but it is not concentrated energy?. It is not positive nor can it be made available. There is sufficient nutriment in the feeds you use to produce good profits in milk, wool, beef, pork or eggs, if fed to animals of the right kind capable of making good use of the feed given them.

Concentration of energy with concentration of thought on everyday duties are the things that will count in bringing maximum results this year on our American farms.

The Battle Cry of Feed 'Em

Yes, we'll rally 'round the farm, boys
We'll rally once again,
Shouting the Battle Cry of Feed 'em.
We've got the ships and money,
And the best of fighting men,
Shouting the Battle Cry of Feed 'em.

The Onion forever, the beets and the corn,
Down with the "tater"—it's up the next morn,
While we rally 'round the tractor, boys
And take the plow again,
Shouting the Battle Cry of Feed 'em.

Use the Old, Weedy Alfalfa Fields to Better Advantage

Mark Austin

General Agricultural Superintendent Utah-Idaho Sugar Co.

(From "The Utah Farmer" May 11, 1918

THERE is a considerable acreage of alfalfa lands overrun with dandelions and other noxious weeds, giving a very small yield per acre, that, if plowed up immediately and planted to potatoes, corn or any other late crop would be excellent for sugar beets next year. In fact, such land could be planted to barley any time this month and would give an excellent crop this year and would be in good shape for sugar beets next year. These lands would yield twice the value in potatoes, corn or barley, under normal conditions, than they will if left in their present state. If the farmer is short of feed, either barley or corn would help him out in that direction, besides which there is a good market for both. While potatoes and corn are the best forerunners for beets, still a good tonnage of beets has been secured following barley.

It is hoped that our growers will improve their farming conditions by taking a portion of their alfalfa land and plow under the green growth of alfalfa which the soil so much needs. The land should be irrigated before being plowed and then see to it that the green alfalfa is well covered; the seed bed should immediately be prepared and planted. The sooner this is done the better.

If the farmers would take hold of this in the right way, the question of feed and fertilizer would be solved, because next year the land will not only give a good tonnage of

beets but a large crop of tops which can be siloed for about $1.00 per ton, or about one-fourth of the cost of raising and stacking hay, per ton. Each acre of tops will feed about three times as much stock as a poor acre of alfalfa.

There are thousands of acres of alfalfa in Utah, in the beet growing districts in this condition. It is a shame that they should be allowed to remain in this unproductive state when food products are so much needed, besides which there is a tremendous loss to the farmer and country. Every acre of soil like everything else should be made to reach its maximum at the earliest possible moment. We hope our growers will take advantage of this splendid method of farming and adopt it wherever possible.

Farm Labor

(From "Hoard's Dairyman" May 10, 1918)

MOST peaceful enterprises are suffering more or less from a shortage of labor or from incompetent labor, and the farm is no exception. We believe the farmers of this country could use more labor to advantage and in many instances are putting up with incompetent help, but, on the whole, the farmers are going to be supplied with enough labor to harvest their crops and do their other necessary work. There are still idle men in the cities capable of doing farm work and there are boys between the ages of 16 and 21 years who have pledged themselves to do farm work and who cannot locate jobs on the farm.

Objections have been raised in some instances, and not without reason, against the use of these boys who have had little or no farm experience. On the whole, however, these boys who, for patriotic reasons, have pledged themselves to do farm work will make good. We know of

one High school that last year sent out seventeen young men and there was only one failure among them. Sixteen of these boys could have gone back this year to the same farmers they worked for last year. This year the same High school prepared 35 young men to do farm work and 33 of them left April 15th to take up their duties on farms. Most of them will make good farm help because they are actuated by the spirit of service and earnestly desire to do their best.

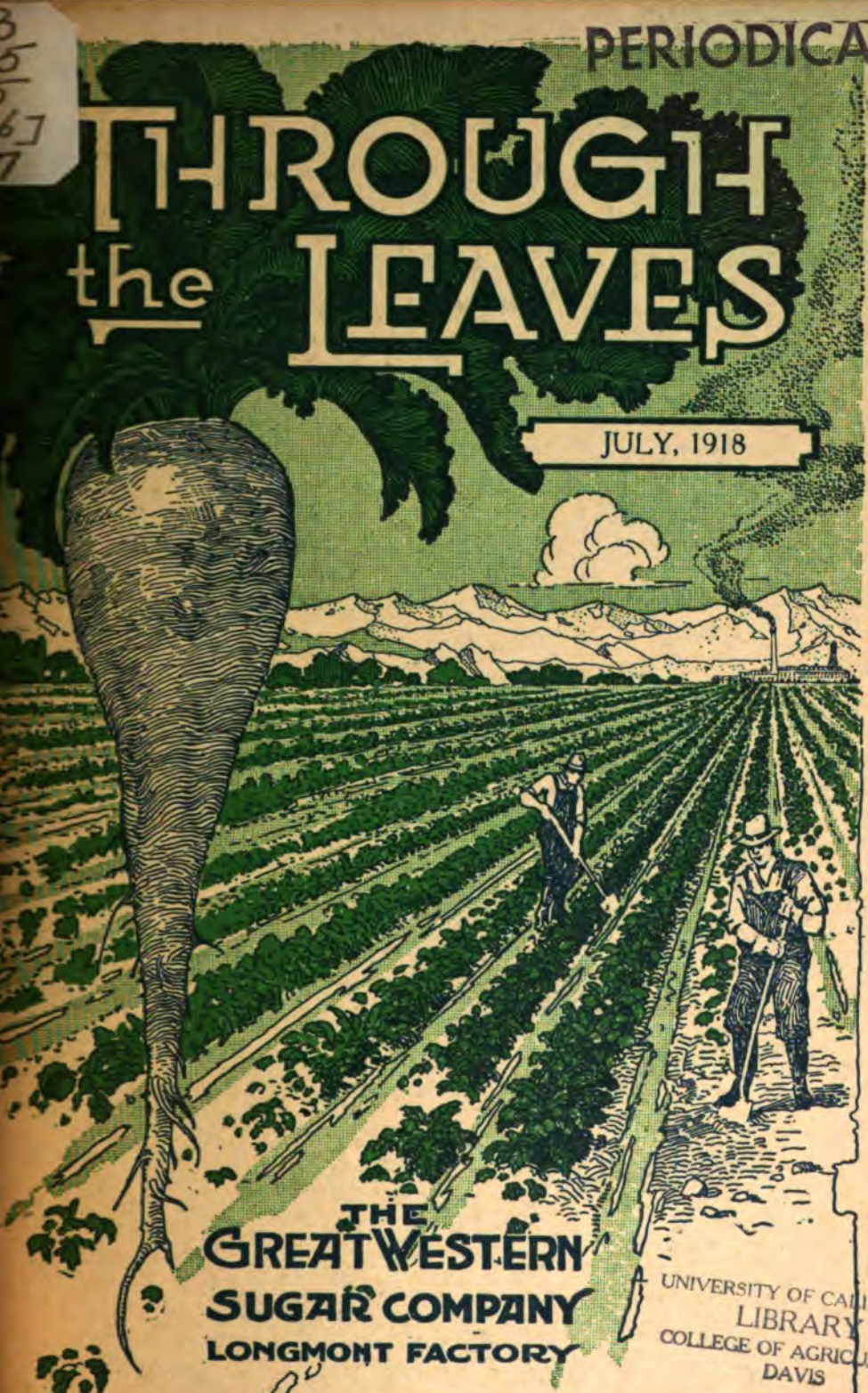
Farmers, in most cases, know that such young men are not seasoned farm hands and willingly take the time to teach them how to do farm work. Whether these boys succeed depends, to no small degree, upon the co-operative spirit of both the boy and the farmer.

Farmers who are in need of help should make their wants known to the labor agencies established in their counties and, if there are none, call on the postmasters of third and fourth class postoffices, for they have been authorized to act as labor agencies under the United States Employment Service. Both the state and federal governments are co-operating in locating and developing men and boys to do farm work.

PERIODICAL

THROUGH the LEAVES

JULY, 1918



THE GREAT WESTERN SUGAR COMPANY
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THROUGH THE LEAVES

JULY, 1918

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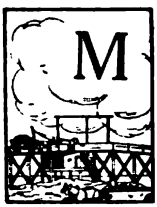
NOTES

Asa C. Maxson



OST of the second hoeing should be done by the time this reaches you. If it is not, rush it. Every bit of soil moisture which is used by the weeds is just so much stolen from the beets. It requires all of the available plant food in your soil to make a good crop of beets or grain. All that is used by the weeds is locked up in an unavailable form until the weeds rot. The weeds are growing rapidly at this time of the year and are robbing your beets of the food that they should have to make that bumper crop.

\+ + +

Some of our labor has taken two or more contracts with as many different men. Usually one of these men furnishes the labor with a house, water, fuel or a team to haul it with; pasture, etc. It stands to reason that the grower furnishing the labor with these has first lean on the services of the labor. This is especially true when this grower is first to sign up with the labor, which is usually the case. If your field man tells you that the labor cannot do your work until he has finished that of the grower who is furnishing him, don't get peeved. Put yourself in the other fellow's place. If your beets are badly in need of tending, the field man will assist you in finding other labor.

\+ + +

We have had several years without serious damage from webworms. This year, however, some fields are going to be damaged unless the beets are sprayed. The Sugar Company is prepared to sell the growers Paris green at 35 cents per pound for use on beets. We have several sprayers which can be had for a small fee per acre.

Watch your fields closely. Ask the field man's opinion

regarding the advisability of spraying. Look out for the second brood of worms which usually appears about the last of July. It is this brood that usually does the damage. Prepare to use 3½ to 4 pounds of Paris green and 100 to 125 gallons of water per acre in spraying. Always apply spray with a power sprayer, maintaining a pressure of 70 to 80 pounds in the tank.

+ + +

The first fifteen days of June have been unusually hot and dry. This, together with the open weather in the early part of the season and the lack of rainfall, means that the soil does not contain enough moisture to keep our crops growing properly for many more days. Prepare to irrigate early.

Bear in mind that small, late planted beets and beets that have been allowed to get too large before being thinned, will require water sooner than the larger and earlier thinned ones. Small beets are not as deeply rooted as large ones so that they are not drawing moisture from the lower levels. Late thinned beets suffer from root pruning which destroys the balance between leaves and roots. These are the reasons why such beets need water earlier than others.

+ + +

In case it should rain while you are irrigating, do not turn the water out of your laterals. Keep it running. Seldom do we get enough rain at one time to wet the soil to a depth of more than several inches to a foot. At this time of the year the larger beets are rooted to a depth of over three feet. If they are to grow as fast as they should, they must have a good and constant supply of water to that depth. The only way we can get the water down to the roots is by irrigating. Use the irrigation to drive the rain down. Another important factor is the atmospheric conditions while it is raining and immediately afterwards. Water applied at these times is applied under more natural conditions than when we irrigate

during hot, sunny days. When the sun is shining brightly and the soil is very warm, irrigation sometimes scalds the beets. This can be prevented by irrigating while it is raining or during cloudy, damp weather.

+ + +

If there are low places in your field where the water stands after irrigating, ditch them if possible. Do not let the water stand as it will rot the beets. Even where water stands in a road ditch above a field the beets are apt to be damaged by the excess water in the soil next to the road. Get rid of this water even though you have to run it through your field.

There are about 23000 beets on an acre of average stand. If two ounces are rotted from each of these, we lose 46000 ounces or 2875 pounds of beets worth $10.00 per ton or $14.375. Once more: get rid of your waste water and your neighbor's, if it collects near your field. It pays.

+ + +

After the first irrigation, get into the field as soon as possible with the cultivator and cultivate and re-ditch. This will prevent the loss of much water by evaporation. The Utah Experiment Station tells us that about one-third of all the water applied by irrigation is lost during the first three or four days after irrigating. Water is too valuable to be lost in this way if it can be prevented. Cultivating will save some of it.

+ + +

During the summer your fields will be visited by a young man who is working for the Sugar Compaiy, making a survey of your fields to secure information regarding certain pests which injure your crop. The Company realizes the importance of securing this information and is paying good money in order to secure it. You, as well as the Company, will benefit from this work, so don't object when this young man pulls a few beets in your field. It's for your good.

Longmont Factory Fieldmen's Directory

Often a grower wants a fieldman to come to see his field or to discuss some question pertaining to his crop and doesn't know exactly which one of the fieldmen to call. For the convenience of growers the following list showing the fieldman's name, his home telephone number and the names of the dumps which they are looking after is given:

Lee McMillen, Gen. Agr.....Telephone Longmont 412J

C. W. Strauss.....Telephone Longmont 549J

Boettcher	Beckwith	Marnett
Downer	Hygiene	Factory
NiWot	Chapman	

T. A. Smith.....Telephone Longmont 574

Foster	Walker	Wild Cat
Liberty	Bunyan	Gowanda
Mead	Evans	Factory

M. H. Griffin.....Telephone Longmont 130M

Leyner	Broomfield	Leggett
Tabor	Goodview	Lafayette

W. H. Riddell.....Telephone Berthoud 34R4

Morey	Fife	Berthoud

W. F. Short.....Telephone Littleton 194W

Westminster	University	Stanley
Gravel Spur	Smith	Petersburg
Littleton	Mac Rose	Fort Logan
Arvada	Thomas	

F. L. Cooper.....Telephone Longmont 546M

Jessum	Plumb	Firestone
Idaho	Harney	Puritan
	Factory	

Factory Office.....Telephone Longmont 406

Use of Manure in Northern Colorado Beet District

H. Mendelson

ROM a survey of our Colorado beet district made by our fieldmen last summer the following facts have been obtained:

1. The manure produced and available for manuring does not depend on the number and kind of animals fed, but on the amount of feed and bedding used and on the care in preserving the manure.

2. The average tenant farm reports 9.8% of the cropped land as manured; the average owner farm reports 12.1% of the cropped land as manured.

3. The averages for each district, with the exception of Fort Collins and Brush, indicate also a higher percentage of manured land on farms operated by owners.

4. The three important feeds—224000 acres alfalfa, 130000 acres beet tops raised in 1916, about 400000 tons wet pulp produced in 1916-17, and about 200000 acres straw, which might have been used as bedding—produced only manure enough for 75600 acres of land reported as manured. Of course, some of the alfalfa was shipped out of the district, some straw was burned and some of the manure made was not used. Some of the beet tops were grazed and the manure obtained by this method is not counted.

5. On the other hand, the acreage reported as manured is probably over-estimated in some districts.

6. The average tenant farm in the Colorado district reports about 10 acres manured. The average owner farm also reports 10 acres manured.

7. The lowest percentage of the cropped land reported is 6.1% on tenant farms in the Sterling district, averaging about 7.4 acres manured per farm.

The highest percentage of the cropped land reported as manured is 17.4% on owner farms in the Greeley district, averaging about 12.6 acres manured per farm. The Greeley estimates of the acreage manured appear a little liberal. The next highest percentage reported as manured is 14.0% on owner farms in the Windsor district, averaging about 13.7 acres manured per farm.

8. The districts of Eastern Colorado as a whole, and the Brighton stations where dairying does not prevail, report relatively much less acreage manured than the districts "around the horn."

9. Although character of the soil, water supply and favorable weather conditions influence the yield per acre more than manuring in any one year, five-year averages indicate that stations reporting a high percentage of manured land this year give a higher yield than those with a lower percentage manured.

The following summary contains only stations where five-year average yields are available:

		5 Yr. Av. Yield Tons per Acre
11 stations reporting	20% of the land manured	13.3
21 stations reporting	15-19% of the land manured	12.7
55 stations reporting	10-14% of the land manured	12.4
41 stations reporting	5- 9% of the land manured	10.8
9 stations reporting	1- 4% of the land manured	10.4

10. Two of the stations reporting 4% or less of the land manured show a high average yield---Gates with 14.2 tons per acre and Powell with 13.8 tons per acre. At both stations favorable soil conditions prevail. At Gates, as in other potato districts, green alfalfa is plowed under. On the other hand, Marnett reports 24% of the land manured, but has an average of only 10 tons per acre, due to cold, clay soil on some farms and cold, wet soil on the river bottoms.

11. Farms delivering at the factories report a higher percentage of the land manured than the average of the whole district.

12. PERCENT OF LAND MANURED

	Farms delivering at Factory	Whole District
Eaton	17	13.0
Greeley	28	15.8
Windsor	22	12.4
Fort Collins	11	9.8
Loveland	23	12.9
Longmont	14	12.4
Sterling	13	6.8
Brush	11	8.9
Fort Morgan	10	8.8

13. Station averages indicate that the percentage of the land reported as manured increases with the percentage of the cropped land in beets, although not in the same proportion.

	Stations "Around the Horn"		Northern Colo. Stations	
% of Cropped Land in Beets	Number of Stations	% of Cropped Land Manured	Number of Stations	% of Cropped Land Manured
5- 9%	12	8.0	4	3.3
10-14%	22	9.4	7	5.4
15-19%	30	11.9	3	4.3
20-24%	26	12.1	6	7.5
25-29%	12	13.1	7	9.3
30-34%	7	18.0	11	12.3
35-40%	3	17.0	2	

14. Stations with smaller farms report a higher percentage of land manured than those with larger farms.

Stations with 20-39 cropped acres per farm average 18.7% of the land manured; stations with 40-79 cropped acres per farm average 12.5% of the land manured; stations with 80-119 cropped acres per farm average 11.1% of the land manured; stations with 120-139 cropped acres per farm average 9.1% of the land manured.

15. In all districts there are a considerable number of farms not reporting the use of any manure.

Of 219 farms at Eaton, Lucerne and Cloverly, 19 report no manure, 8 of which raise beets.

Of 211 farms at McClelland, Giddings, Woods, Drake, Cuthbertson and Harmony stations with more than 50% of the cropped land in alfalfa, 57 use no manure, 30 of which raise beets.

Of 230 farms along the Great Western railroad, not including Johnstown, 34 report no manure, 10 of which raise beets.

Of 235 farms at Brighton stations, not including those with pronounced dairy activities, 89 report no manure, 35 of which raise beets.

Of 240 farms at the stations Becker (Johnstown), Ione, Brighton, Wattenberg and Lupton, with pronounced dairy activities, 30 report no manure, 14 of which raise beets. Of these dairy farms, 1 with 5 cows, 2 with 6 cows, 1 with 10 cows, 1 with 16 cows and 1 with 17 cows, report no manure used.

16. On the beet raising farms reporting the use of manure:

At Ft. Collins Stations 65% of the beet acreage is manured
At Grt. Wstn. Stations 51% of the beet acreage is manured
At Brighton Stations 39% of the beet acreage is manured
At Dairy Stations 54% of the beet acreage is manured

At the Eaton stations the acreage reported manured on beet raising farms exceeds the beet acreage. Here a considerable amount of manure is used for potatoes.

17. On the 114 dairy farms where manure was used, 1489 cows produced manure for 1360 acres, or a little less than one acre manure per cow.

On 9 dairy farms with more than 30 cows per farm, only 0.63 acre was manured per cow.

18. It is evident that on quite a number of beet farms where some manure ought to be available, none is used. There is a good field for missionary work.

Irrigation of Beets

John Comer, Seed Superintendent

When to Irrigate

IF you know how to irrigate without flooding, if you know how much water to give, you should irrigate beets when they need it, regardless of age.

If the beets are small there is danger of giving more water than is good for the soil and the beets. Therefore, when irrigating small beets give a light irrigation and irrigate only every other row.

If the weather stays dry, repeat the irrigation two days later in the opposite row, until the beets shade the ground.

Cultivation should be given after each irrigation as soon as the soil is in condition.

Knives possibly followed by duck-foot or bull-tongue are the best tool to use, as they will kill small weeds and scrape loose dirt into the ditch, making a mulch over the moist soil.

Making Ditches.

When making ditches for irrigating small beets it is advisable to tie a piece of a pole about two feet long to the rear of the ditcher. This smoothes out the ditch and is a great help to prevent flooding.

The distance between cross ditches has to be carefully determined by the slope of the land and the ability of the soil to absorb moisture. This distance should be just enough so that when the water reaches the lower end of the furrow the soil is just soaked enough. This varies, of course, in different farms and soil types.

Irrigating Steep Slopes.

If your land has a rather steep slope it is best to use a very small head of water. Even then the top soil from the high parts of the field is washed to the lower part.

Sometimes this trouble can be partly overcome by allowing the water to run only half way down the field. Then stop irrigating until the wet furrow is fairly dry and packed, and then irrigate once more until the water reaches the lower part of the field and has it wet up as desired.

Irrigating When it Rains.

If it sprinkles a little and your beets have suffered from lack of water, irrigate nevertheless. If you have only enough water for two irrigations and it sprinkles enough to hold the beets for a week longer or so, it is better to delay the irrigation.

Second and Third Irrigation.

After the beets are big enough to shade the ground they should have one irrigation where all the water is given that the ground will hold. In fact, the biggest yields can be obtained only if the field is kept moist until it is time to get the soil dry enough for the harvest.

Cultivating After the Beets Shade the Ground.

Usually beets do not need cultivation after they shade the ground, unless the soil is in such a condition that it will not take water.

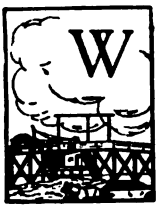
Timely and proper irrigation is a very important factor influencing the yields. While it is impossible to give rules fitting every case, the principles of good irrigation practive are not difficult to understand.

A farmer thoroughly familiar with the lay of his land, the character of the soil, the available water supply, and the requirements of the crop, will not make many mistakes if he takes the trouble to carefully think over the situation and is willing to do the right thing at the right time.

I want to emphasize again that beets should be irrigated when they need it, even if they are small. But be careful how you do it. Too much water at that time is almost as bad as not water enough.

Sensible Irrigation

J. F. Jarrell



HEN water becomes scarce it is up to all of us to adjust ourselves to the conditions and make the best possible use of the available supply.

The need of adequate division boxes is felt and the greed of our neighbors is seen more than ever when the water is low.

There are cases where some one who owns a large share in the ditch controls the amount of water allowed to the other share holders. This works all right until there is a shortage of water, then the one who has been in the habit of dictating the policy of the distribution of the water becomes a greed controlled water hog, and the other fellows suffer. I am sure that if every one interested in a ditch fully realized at all times exactly what was due him and was allowed only his portion of water to use on his place, he would become accustomed to it and not expect to borrow water from a half dozen neighbors in order to rush his work through.

Water users under all ditches should diversify their crops so the water would not be needed all at once. We will suppose the crops grown are wheat, beets, alfalfa, corn and other grain. That would distribute the need of water over the whole season and a farmer could count on getting his share of the water to apply to his place when needed. Farmers waste water in irrigating to a greater extent than is realized by most men. Experiments conducted in California brought out the fact that many farmers were using twice the amount of water which was necessary. A more sensible use of the water irrigated more acres in California and it will do the same in Colorado.

Great quantities of water are wasted every year, soaking up roadways and seeping away through the subsoil on account of not sufficient attention being paid to the action of the water on the fields.

Irrigation requires constant attention to the detail of making the water work to the best advantage. Some irrigators try to work 24 hours per day and they usually succeed in working about 6 hours on account of trying to snatch a little sleep now and then. In this way water is wasted while the irrigator is asleep. It will pay the farmer to keep his irrigator busy rather than try to have him feel that there is very little to do except turn the water in.

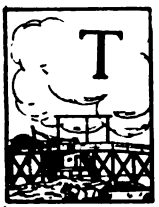
I have seen men go out to irrigate and after turning the water into the field they would pay no attention whatever to its action on the field, but would take up a station at the lower edge of the field and as soon as the water reached that point they would shut it out, claiming the field was irrigated.

Water running in its natural course down the stream is of little benefit to a farm; it is only a step in the direction of what we want when we construct a ditch. Another step is to put in suitable laterals and from these sub-laterals located at the proper place to convey the water where it is needed. The stream, the ditch, the lateral, and the sub-lateral require very little attention after being put in shape to handle a season's water, but the spreading of the water on the field does require very careful attention. Then there is the waste water, which, like a dead man, is not of much use, but has to be disposed of. This requires waste ditches of suitable size and location to handle the waste water. Some people seem to think that the county roads are built especially to take the waste water from their farms; most farmers, at some time or other, are guilty of wetting the roads to the annoyance of those who use them. What a foolish thing to do.

Good streams, ditches, laterals, sub-laterals and sensible men to handle the water in the field will make the prairies of Colorado a good place in which to live. The same combination of streams, ditches, laterals, etc. with foolish, careless men to handle them, will make the same section what some one has said war is.

Just a Word

M. H. Griffin



HERE is one phase of sugar beet growing that is very important, and as time goes on and cultivation becomes more intensive, is sure to become more and more important. I refer to insect injury.

There are several little bugs that at times insist on eating up the beet crop; likewise several fungus diseases.

To successfully combat these pests there are many methods of attack, and, in many cases, men are sent out from the Longmont factory by Mr. A. C. Maxson, in charge of the Experimental Department, to make a complete survey and examination of any infested area.

Two years ago the writer undertook a survey, during the summer months, of the territory around Greeley, Eaton and Ault, trying to determine, if possible, the source of infection of the beet root louse, and also, by an examination of all fields, the extent of infection, and the relation, if any, between the extent of infection and the previous crop and character of the soil; we desired to correlate the relation between the source of infection and the amount of infection. At the same time a report of all other fungus and insect pests was made. What I am driving at is this, and I wish to make a request to all growers who read "Through the Leaves," that when they see a man in their field, a man whom they may think has just escaped from Pueblo, making an examination of their field and staring vainly at the trees, that they do not run him off with a shotgun or judge him out of his mind, but that they give him credit for having some business there, that they consider him sent out from the factory, and that they thus show their appreciation for the effort The Great Western Sugar Company is making to help them fight all pests and raise a maximum crop.

There are some young men out now; give them a welcome reception. They carry a letter from Mr. Maxson stating their business.

Shortage of 2,000,000 Tons of Sugar Reason for Saving

From "Weekly News Letter," U. S. Dept. Agr.

IF any man has failed to see the reason why he should cut his plentiful apportionment of two spoonfuls of sugar to the one of war time, he can find it in a recent publication of the United States Department of Agriculture, explaining world-wide shortage---especially the shortage among the allies---in the supply of sweets.

Not only has the supply of sugar in some parts of the United States been short, but there has been an actual shortage of more than 2,000,000 tons annually in the world since the war began, and the shortage is likely to continue. the publication says, primarily because of the destruction of a large number of sugar mills and the devastation of a considerable area of sugar-producing lands in Europe.

Prior to the war practically all the belligerent countries, with the exception of the United Kingdom and Italy, exported sugar, the total amount being upward of 3,000,000 tons. War, however, has changed the sugar-production map, and at the same time has shifted the channels of trade. In 1918 it is estimated that the allies must import a minimum of 1,200,000 tons of sugar.

Formerly the United Kingdom and France depended to a considerable extent upon Germany, Austria-Hungary, Belgium and Russia for sugar. These sources were shut off by the war. The United Kingdom alone thus lost the source of more than half of her normal supply of sugar and has turned to new as well as other old sources for her supply. The changes thus brought about have been largely a diversion of the product of Mauritius to the United Kingdom instead of to India, and an expansion of the im-

ports of unrefined sugar from Cuba, the Philippines and Peru. For refined sugar she drew upon the United States and Java. However, the allies can not turn to such exporting countries as Java and Mauritius without being forced to go a much longer distance and over a more perilous route than across the Atlantic. If the allies are compelled to go to these countries it will require an extra amount of shipping which is needed for transportation of American soldiers and supplies to France and England.

Russia's exports practically ceased in 1914, and she is now reported as somewhat short of sugar. Italy's crop decreased last year and her imports have increased largely since the war began. Italy's normal consumption, however, is small and her deficit is not serious.

Meteorological Report

FOR MAY, 1917 AND 1918

Temperatures:	1918	1917
Mean Maximum	73.29°	59.80°
Mean Minimum	39.48°	36.80°
Monthly Mean	56.39°	48.30°
Departure from Norm.	+0.79°	—7.30°
Maximum	87.00° on 8th	84.00° on 15th
Minimum	30.00° on 9 10 11	18.00° on 5th
Precipitation in Inches:		
To Date	7.36	7.94
For Month	2.02	4.66
Greatest in 24 hours	1.18 on 30th	1.36 on 24th
Departure from Norm.	—1.21	+1.36
Number of Days:		
Clear	16	2
Partly Cloudy	12	16
Cloudy	3	13

Excessive Irrigation

Leo L. Lathe
Agricultural Agent, Park County, Wyoming

OW many irrigation farmers realize that too much irrigation is as bad as too little? The difference is that too little shows up in the present year by burnt crops, while with too much irrigation, it takes several years to show the injury.

Few farmers who have access to a large amount of water do not practice over-irrigation. The reason for this is that it is a little easier to turn the water on and let it go than it is to watch it and turn it off at the right time.

The injuries caused by an excessive use of water are: Puddling of the soil or bogging; driving out all the air from the soil and causing it to become sour. Generally in this country it becomes alkaline instead of sour.

The alkaline condition in this country is due to the fact that the mineral salts in the arid soils are very soluble and have never been washed out of the soil. Excessive irrigation waters take these salts in solution and carry them to the lowest place in the basin. If there is no natural under-drainage, the water table is raised. This brings the water to the surface by capillary action where it evaporates, leaving all the salts behind. When this occurs, an alkali bog is the result.

This can be remedied in several ways.

First, be careful of your irrigations and do not apply any more water than the soil will hold in the first 6 to 8 feet. This can be done by using a large head of water and covering the ground in a short time. Otherwise the small head will just soak into the ground and the upper

end will be over-saturated by the time the water reaches the lower end of the field. Consequently there will be a lot of waste water going into the lower stratas of soil instead of just supplying the plant root reservoir.

Second, by increasing the humus content of the soil, the storage capacity is greatly increased. This will permit more water being held in the first 6 to 8 feet of soil and there will not be so much danger of a large run-off, and the irrigations will not have to be applied so often. Sub-soiling in soils that are compact will increase the storage capacity and have the same effect in moisture control as humus.

The third method is by artificial drainage. This is expensive, but like any other trouble, the alkali must be cured. It is better to use prevention when possible than to use the cure. Where bogs are already formed or there is danger of them forming, it is best to put in a drainage system and lower the water table so that the alkali laden water will not reach the surface. After the drains are in the alkali may be washed out of the soil by a generous use of water and by proper treatment and cultivation. Eventually, the bogs may be brought back into good cultivation.

In this county, we have instances where the natural drainage has been stopped so that now there is no chance for under-drainage. Even with this impediment in the way the regular irrigations have been applied, whereas there should only be enough water used to wet the first few feet of soil---probably about two or three feet. All water applied over this amount just runs into the lower water table and causes it to rise a little. In time this will raise the water table till the land will become a bog. In a case of this kind, the farmer should use light and frequent applications of water.

GRAIN BAGS ARE VALUABLE NOW—MAKE THE OLD ONES SERVICEABLE

Delay in Irrigation Will Cut Production

Lord Ogilvy in "Denver Post"

SOME people insist on procrastinating with their irrigation.

Dry farming is one thing, irrigation something else. Dry farmers use especially adapted grains such as the Russian wheats. They do not expect a catch of alfalfa along with their grain and on account of moderate cost of operation are satisfied with a small number of bushels except in those favorable seasons when things all break right. Not only that, but the most successful store as much moisture as possible in the soil, often from two years' rainfall.

Propitious spring rains start a big crop which, of ordinary seeds, are far more than the soil moisture can mature as the spring wheats, oats and barley have little of the self-thinning habit as drouth comes on. They are just as apt all to burn together as to take thought for the future. It therefore devolves on us to do some thinking and make provision for them. Seldom have we had more drying winds, less May rains and hotter weather at this season. The weeds, a good sign of moisture conditions in the soil, are burning up, notwithstanding their special adaptation to arid conditions and the short season their growth occupies.

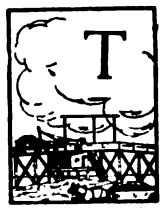
There is great difficulty in not overwatering the garden at certain times. Because a plant wilts slightly, especially corn, that is no reason to think it is at death's door, but neither is the fact that it does not die a reason for withholding a reasonable amount of water for its greatest and most rapid development. Moreover, the corn plant and sorghums are far more drouth resistant than cereals, alfalfa and most garden plants or field crops. While it is perfectly true that we have at times overwatered the garden it is equally true that it has often been

underwatered. I doubt if King Solomon could exactly weigh out water in the exact optimum quantity. In the garden we can remedy the deficiency of yesterday, today and far more easily correct the defects of under than over-irrigation, but this is precisely what cannot be done on an extended acreage. Provision must be made for the future and by June month the danger of over-irrigating cereals, especially those planted with alfalfa, is ordinarily passed and the alfalfa irrigation should have been got out of the way long ago. Ninety per cent of the time this is a dry climate in which we expect to raise and with proper methods do raise crops two or three times greater than can be done in a rainfall country, and we do it precisely because the sun shines almost uninterruptedly, though the nights are cool, and because we can apply water for the maximum transpiration and residue of dry matter that enters into the composition of the plant. We do not trap the sun in the manner of the hot house men, but our conditions give us very much the same result. Deficiency of sunlight or moisture both arrest growth. The combination of the two produce the greatest result possible with the plant suited to the soil and season. To withhold water in maximum optimum quantities is simply to shorten production from a hundred bushels downward to the production of a cloudy country with a catch as catch can rainfall and adopt a policy of hit or miss, but with the certainty, however, of some loss.

Overwatering is responsible for some loss, but under our now extended irrigated area it is imperative that some water be stored in the soil ahead of the needs of crops that will certainly make use of it, and we have had to correct the idea that some crops were the better for undergoing spells of want before irrigation. Though water sometimes works a wonderful cure, a continuous growth and development is to be preferred so long as it is not carried to an excessive development of straw and vine at the expense of grain, tuber and root.

"Work or Fight"

From "American Farming"



HE order of President Wilson, issued through Provost Marshal Gen. Crowder, that all men of draft age either fight or go to work in essential industries, meets with the hearty approval of farmers. For some time farmers have been contending for some such order, and their only regret is that it is not even more drastic.

Under the "work or fight" order, all men of draft age engaged as waiters, bartenders, valets, footmen, doormen, butlers, chauffeurs, elevator boys, theatre ushers, clerks and in many other similar lines---in addition to thousands of loafers and others who do not even pretend to be employed---must by July 1st find employment in essential industries or go to war. This will make available a vast army of workers for farming and other necessary industries now under-manned. And it will also "smoke out" thousands of men who have been shirking their responsibility in the present great crisis.

Benjamin J. Rosenthal, a prominent Chicago business man who has devoted considerable time to directing efforts to find employment for men past 45 who have been displaced by younger men, and to finding employment for those otherwise handicapped, favors raising the age in the new order to 60 years, "so that the work of every man may be directed to the work of winning the war, either as a soldier or as a worker back of the lines."

Prof. Thorstein Veblen, professor of economics at the University of Missouri, proposes a tax on useless servants, such as butlers, valets, doormen, maids, etc. He would allow one servant to each household of five persons, providing that household includes at least two children under five years, but would tax all other persons retaining servants at the rate of 100 percent of the wages of the first servant, 200 percent for the second, 300 percent for the third, etc.

Irrigation and Cultivation of Sugar Beets

Mark Austin

General Agricultural Superintendent Utah-Idaho Sugar Co.

THE unusual hot and dry weather we have had thus far, this season, with the exception of a few localities where a fair supply of rain has fallen, makes it quite necessary to watch the beets and soil very closely; especially is this so on the heavily manured lands and those recently broken from alfalfa and planted to beets. The farmers should see to it that the soil is not allowed to become too dry, or the beets will be stunted; they are then subject to all kinds of disease and insects. Even though the beets may be very small, if the soil is dry, water should be applied at once so they will not suffer. This can be done by furrowing out every other row carefully, exercising care not to cover the beets with dirt. The water should then be turned into the furrows, sufficient to give the beets a light irrigation; care should be exercised so as not to flood them any more than can be avoided. You should have sufficient cross ditches so the water will not run too far in the row. By turning the water in every other row, should there be a little excess moisture and the weather turn cool, the soil between the irrigation furrows will absorb it so the plants will not be injured.

By keeping the beet fields free from weeds and plenty of cultivation will help retain the moisture, while the beets are small. Until the foliage becomes so large that further cultivation would be injurious to the beets, they certainly should be cultivated after each irrigation, to keep the soil in first-class condition. It will not be necessary to irrigate so often if the soil is kept thoroughly cultivated, as long as the foliage will permit.

It is hoped that this matter will have the careful atten-

tion of our growers. There was considerable loss last year on some fields by reason of the farmers being too late with their first irrigation; also some did not irrigate quite late enough in the latter part of the season and their crop was very materially reduced in tonnage. Beets should never be allowed to suffer for water any time during the growing season; the soil should be kept moist and in first-class condition. Of course the beets should not be watered while there is sufficient moisture in the ground, nor should they be over irrigated, but as stated above they should be kept in a growing condition at all times to get the best possible results.

The main object I have in calling this to the attention of our farmers now is, not that all beets need water at the present time, but with a view of getting our growers who have been a little careless in the matter to make their preparations for irrigation sufficiently early to properly take care of their crop.---Utah Farmer, June 10, 1918.

Look Out for Fires in Hay Stacks

A well-filled mow or a big stack of hay, symbol ordinarily of happy prosperity, may contain within it the lurking spirit of a fire that will sweep a farmstead.

Many destructive blazes, points out a Department of Agriculture bulletin on fire prevention, have been caused by a spontaneous ignition of hay, especially clover and alfalfa. The first cutting of the latter seems to be most dangerous. If hay of this kind has rain or dew on it or if the stacks are not cured thoroughly, the moisture will cause fermentation which may produce sufficient heat to start a fire. The combustion, however, can not continue long without oxygen and may cease without coming to the surface. Its presence can be detected by a peculiar sooty odor or by smoke irritating to the eyes. It may take place from a few days to several weeks after the hay is put up.

Let Sweet Clover Bloom on Wastes—Means More Honey

From Weekly News Letter, U. S. Dept. Agr.

LET the sweet clover grow this year in vacant lots along roadsides and along railway rights-of-way until after the blooming season. Thus provide more nectar for the honey bees and eventually more substitutes for sugar. This appeal is made by the United States Department of Agriculture.

Sweet clover, recognized by beekeepers for many years as a valuable honey plant, has been considered a weed in many places. City, county, and railway authorities as well as farmers have cut the plants before the blooming season, thus preventing them from maturing seed.

It is admitted that sweet clover will make a vigorous growth if unmolested, many of the plants reaching a height of 6 feet, but it is not difficult to eradicate, and sweet clover recently has become well known as a valuable forage plant. Thousands of acres in some sections of the country are planted annually to grow forage crops, and results have justified the rapidity increasing acreage.

The United States must not only increase sugar production for domestic needs, but must ship an increased quantity to the allies. Every effort should be made this year to stimulate production of substitutes for sugar. In localities where sweet clover is growing abundantly, city, county, and railway officials are asked to cooperate with beekeepers and see that all well-known nectar-producing plants and especially sweet clover, are not cut until after the blooming period. This plan was practiced in at least one locality last year with gratifying results, and it is hoped that all sweet clover growing within a mile of col-

onies of bees will be permitted to stand until after the blooming period this year.

Sweet clover not only produces an abundant flow of nectar over a long period but does not begin to bloom until the white clover and alsike clover nectar flowing is nearly over, thus supplying an abundance of nectar when few nectar-producing plants are in bloom. Owners of bees are advised to make every effort to bring the importance of sweet clover to the attention of officials in charge of mowing plants in vacant lots, along roadsides, and along the rights-of-way of railways, and to endeavor to have the mowing of such places where sweet clover is growing delayed until the flowering period is past. By hearty cooperation to this end the department says, the production of honey can be considerably increased this year.

Thrift Stamps a la Walt Mason

"In times of war they ask us for the necessary cash, to land upon the war-like Hun and deal the fatal smash.

"And it is right. To win the fight we've got to have the dough, and those who stay will have to pay for those who have to go.

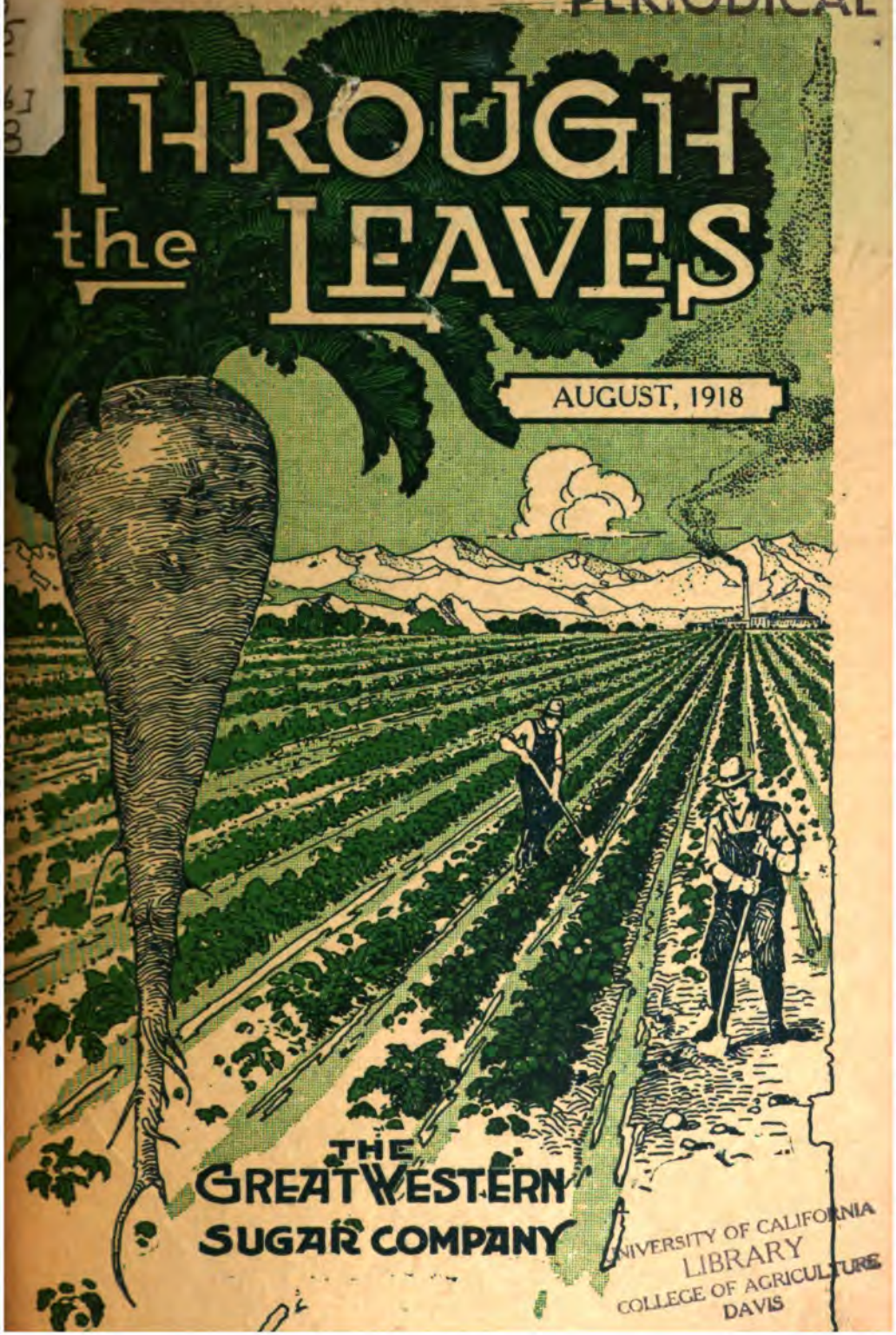
"So buy THRIFT STAMPS and put the clamps upon the German horde. We'll surely win if you kick in, buy all you can afford.

"The boys who fight have every right to look to us to pay. They bear the brunt, so do your stunt and BUY THRIFT STAMPS TODAY."

PERIODICAL

THROUGH the LEAVES

AUGUST, 1918



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THROUGH THE LEAVES

AUGUST, 1918

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ANNOUNCEMENT

For more than five years past this booklet has been going out to the growers of the Longmont Factory. We believe it has carried some ideas that have been helpful to the growers and many have been kind enough to say that it has been a most useful publication.

Through the solicitation and suggestion of the Agricultural Department of our General Office, the mailing list has been very materially increased and this number is going to about 5,000 different readers.

We hope it may prove both interesting and helpful to those to whom it is new, as well as to those who are already familiar with it.

NOTES

N. R. McCreery

HE beet crop generally is looking very well, thank you.

\+ + +

In the sections where the heavy rains have fallen, there has been a tendency to defer the irrigation of beets. We believe the best results will follow if the irrigation is not delayed, as the beets dry out very quickly, and there is a liability of the crop suffering before the grower realizes the need of water.

\+ + +

We want all growers interested in feeding to read Mr. Mendelson's article in this issue entitled "Pulp is Still Cheap."

\+ + +

At the present time there seems to be plenty of beet help available for the fall work. If any growers need additional help or if your labor has changed to some other location, please get in touch with your fieldman now. Do not wait until harvest time and then advise that you need help.

\+ + +

This year has been no exception to the general rule that early planting is best. The late plantings have suffered much from hot weather, while the early planted fields have made a good growth. A little more demonstration of the advantage of fall plowing for Colorado soils. We know every one will have about all the work he can do this fall, but we also believe that by careful planning, enough land can be fall plowed to provide for next year's beet planting and we know that it will make a big difference in the returns from the crop.

The general information that reaches us is to the effect that the Northern Colorado wheat crop is very disappointing, the general average per acre being placed at about 75% of last year. The total yield will probably be as much but a much larger acreage of land has been utilized to produce it.

\+ + +

As time goes on we see more government regulations and restrictions in the use of sugar in an effort to make the meager supply stretch out over the needs of the nation and her allies. Those farmers who have fields of sugar beets may well feel proud of the service they are rendering at this time.

\+ + +

WEB WORMS

Some beet growing sections have had to fight web worms during the early part of July. It may be that these will again be with us in alarming numbers during the last of July and early August. We would urge that you keep a sharp lookout for this pest and get in touch with your fieldman promptly if any are discovered. Web worms need not cause any damage if taken in time, as the spraying with Paris green proves very effective.

\+ + +

One of the main sources of labor trouble is poor housing of the labor, or dependence upon pick-up labor to avoid the building of a laborer's house. One of the very necessary things if a person expects to grow beets is a house for the labor. This is just as essential as a drill or a cultivator and should be included in the list of necessary equipment. It is needless to add that a good, substantial building will be found the cheapest. In the event of the land being farmed by a tenant, the land owner should furnish this house and the tenant should insist on a habitable beet laborer's house before he signs his lease.

\+ + +

The suggestion has come to us that we should open up a Question and Answer Department in our book. This we will be glad to do if there are questions enough re-

ceived to justify. If you have any questions regarding beet culture, live stock raising or feeding or irrigation farming that you desire answered, if you will send them to "Through the Leaves," Longmont, Colo., we will endeavor to secure the most expert advice obtainable and answer them through the pages of this publication.

Plan Now For Next Year's Sugar Crop

Colorado Crop for 1918 is Short and 1919 Acreage Must be Increased 40,000 to 50,000 Acres

(From Colorado Agricultural College Bulletin)

E are beginning to feel the sugar shortage, and we will feel a greater shortage before the 1919 sugar crop comes in, according to Prof. Alvin Kezer, of the Colorado Agricultural college. "The Colorado 1918 sugar crop will be about 50,000 tons short of the 1917 crop if present prospects are not changed," says Prof. Kezer, "which means that we will feel the pinch of a deficient sugar supply because of a deficient acreage in our own state.

Now is the time to commence to plan for the 1919 planting. The government has shown its willingness to protect the grower with a fair price. The grower should make his plans now to help protect the supply by planting a fair acreage of good sugar beet lands. The 1919 crop should be increased 40,000 to 50,000 acres. Care should be taken that this increase comes on lands adapted for sugar production. The best sugar beet lands should be planted. Lands not capable in ordinary seasons of producing a sugar crop should be planted to wheat."

"Plan now."

Draft Horses Required

H. Mendelson

(1) The larger the cropped acreage per farm, the smaller the number of draft animals required per 100 acres cropped land.

Averages for Colorado Stations show the following:

Number of Stations	Cropped Acres Per Farm	Horses per 100 Acres Cropped Land
6	20- 39	8.8
10	40- 59	7.2
20	60- 79	6.5
47	80- 99	6.3
50	100-119	5.8
27	120-139	5.6
5	140-159	4.7
3	160-179	4.7
1	180-189	4.8
1	550-559	4.0

While it is true that larger farms have a smaller percentage of the cropped land in beets and therefore need a smaller number of horses for the same acreage of cropped land, nevertheless farms not raising beets at all show the same decrease of horse requirements with an increase in size.

For instance, farms in the Eaton territory not raising any beets show, as follows:

Number of Farms	Cropped Acres Per Farm	Horses per 100 Acres Cropped Land
63	40- 79	7.0
42	80-119	6.0
82	120-159	5.0
9	160-199	5.0
26	over 200	3.9

(2) The number of draft horses required per 100 acres cropped land increases somewhat with an increasing percentage of the cropped land in beets, as shown by the averages of Colorado Stations with from 80-139 acres cropped land per farm.

Per Cent of Cropped Land in Beets	Number of Stations	Horses Per 100 Acres Cropped Land
5- 9	19	5.1
10-14	28	5.7
15-19	18	5.9
20-24	23	5.8
25-29	15	6.7
30-34	17	6.9
35-39	3	7.7

These station averages indicate that on farms with 80-139 acres cropped land no more horses are required per 100 acres cropped land when the percentage of the cropped land in beets increases from 10 to 24%. About one more horse is required when the per cent of beets increases from 25-34%, and another when 35% or more of the land is in beets.

(3) The average northern Colorado irrigated farm compares with the average Iowa farm as follows:

	Northern Colorado	Iowa
Total acres per farm	136	156
Acres grain per farm	28	28
Acres intertilled, (beets, beans, corn, potatoes)	31	47
Acres hay per farm	29	17
Miscellaneous crops	3	
Total cropped per farm	91	92
Horses per farm	5.4	7.2

The average Colorado farmer, beet raising and non beet raising, does not use as many draft animals for the same cropped acreage as the farmer in the corn belt.

This in itself is strong evidence that beet raising within reasonable limits does not require essentially more draft horses than other forms of farming.

(4) A study of 512 beet-raising farms in the Loveland, Longmont and Sterling districts shows the following figures:

Average cropped acres per farm.....120
Average acres of beets per farm..... 35
Average horses per farm..... 7.7

(5) A study of 374 beet-raising farms in the Scottsbluff district shows:

Average cropped acres per farm.....93
Average acres of beets per farm..... 32
Average horses per farm..... 6.1

(6) A study of 231 farms in the Eaton district, raising no beets, but potatoes, shows:

Average cropped acres per farm.....126
Average acres of potatoes..... 32
Average horses per farm..... 6.6

(7) 181 farms in the Eaton district raising beets and potatoes:

Average cropped acres per farm.....127
Average acres beets per farm..... 21
Average acres potatoes per farm..... 24
Average horses per farm 7.3

(8) 54 beet-raising farms at La Salle (bean district):

Average cropped acres per farm..... 86
Average acres beets per farm..... 23
Average acres beans per farm..... 19
Average horses per farm..... 5.1

(9) 36 non beet-raising farms at La Salle (bean district):

Average cropped acres per farm..... 81
Average acres of beans per farm..... 23
Average horses per farm..... 5.1

(10) The number of horses kept per 100 acres cropped land on these farms is as follows:

All Iowa farms	7.8	No beets
All Northern Colorado farms	6.0	16.4% of cropped land in beets
512 Northern Colo. beet farms	6.4	28.8% of cropped land in beets
374 Scottsbluff beet farms	6.5	34.5% of cropped land in beets
231 Eaton potato farms	5.4	No beets
181 Eaton potato & beet farms	5.7	16.2% of cropped land in beets
54 La Salle beet farms	6.0	26.6% of cropped land in beets
36 La Salle bean farms	6.3	No beets

All these groups of farms whether raising beets or not, use fewer horses than Iowa farms.

(11) The larger the acreage of beets on the farm, up to a certain limit, the more acres of beets are handled per horse, as shown in 512 northern Colorado beet farms segregated in groups of the same number of cropped acres per farm:

No. of Farms	Cropped A. per Farm	A. Beets per Farm	% Cropped land in Beets	Horses per Farm	Acres per Horse Total Cropped	Beets
41	20- 39	18	54	5.0	6.7	3.7
166	40- 79	25	37	6.0	11.3	4.1
105	80-119	32	32	7.2	13.7	4.4
131	120-159	42	25	9.1	18.4	4.6
27	160-199	47	26	9.4	19.2	5.0
42	Over 200	65	24	13.5	20.3	4.9

12) The influence of size of farm, characteristic crop raised and horse requirements can be seen from the following figures:

(a) Stations with more than 20% of the cropped land in potatoes
(b) Stations with more than 50% of the cropped land in grain
(c) Stations with more than 50% of the cropped land in alfalfa
(d) Stations with more than 20% of the cropped land in beans
(e) Stations with more than 30% of the cropped land in beets.

	Acres Cropped Land Per Farm	Horses Per 100 Acres Cropped Land	% of Cropped Land in Beets
(a) Potato stations	122	5.4	8.4
(b) Grain stations	114	5.5	12.1
(c) Alfalfa stations	98	5.9	19.2
(d) Bean stations	80	6.1	13.3
(e) High beet stations	81	7.1	33.2

The average farm at the bean stations and at the stations with more than 30% of the cropped land in beets con-

tains the same number of cropped acres. The high beet station farm uses one horse more per 100 acres cropped land, but that one horse is sufficient for 2.5 times as many acres of beets as on the average bean farm.

(13) The influence of the hauling distance from the dump on the number of draft animals required can be seen from the following figures. The farms in the districts mentioned were divided in two groups---those with less than one mile from dump (short haul), and those with more than one mile from dump (long haul).

The districts selected were:

All stations on the C. & S. from Cuthbertson to Boyd.

All stations on the Great Western Railroad from Bird to Welty.

All stations on the C. & S. from Campion to Boettcher.

	Cuthbertson to Boyd		Bird to Welty		Campion to Boettcher	
	Short haul	Long haul	Short haul	Long haul	Short haul	Long haul
% of all cropped land in beets	26.7	18.2	25.6	21.3	16.9	11.6
Acres cropped land per farm	88	104	123	105	77	90
Acres beets per grower	27	23	39	27	18	18
Draft animals per farm	5.8	5.8	7.3	6.8	4.9	5.4
Draft animals per 100 Acres cropped land	6.7	5.6	5.9	6.5	6.3	6.1
% farms operated by tenant	57	52	64	51	41	45
% farms not raising beets	14.3	25.5	18.2	15.9	27.7	41.0

The long haul farm in the Cuthbertson-Boyd district with 104 cropped acres and 18.2% of the land in beets uses 5.6 horses per 100 acres cropped land.

The short haul farm in the Campion-Boettcher district with 77 acres cropped land and 16.9% of the land in beets, uses 6.3 horses per 100 acres cropped land.

Evidently neither the length of haul nor the per cent of land in beets influenced the horse keeping. As shown before, the smaller sized farm uses relatively more horseflesh than the larger one.

In the Bird-Welty district the short haul farm with 123 acres cropped land and 25.6% of the land in beets uses 5.9 horses per 100 acres, while the long haul farm with 105

acres cropped land and only 21.3% of it in beets, uses 6.5 horses per 100 acres.

Again the smaller farm, although having a smaller acreage of beets, uses relatively more horse flesh.

Also in this district are a number of breeders of Suffolk Punch horses---probably kept without regard to the actual requirements of horse power.

In the Cuthbertson-Boyd district the short haul farm of 88 acres cropped land and 26.7% in beets uses 6.7 horses per 100 acres, while the long haul farm of 104 acres with 18.2% of it in beets, uses only 5.6.

Again the smaller farm uses relatively more horse flesh, although in this case the smaller farm raises also relatively more beets.

On the whole it seems that other considerations besides the amount of beets raised and the distance from the dump influence the number of horses kept, very materially.

But it appears that when distance begins to be a determining factor, either a larger per cent of the farmers refuse to raise beets, as in the Cuthbertson-Boyd and the Campion-Boettcher districts, or else the number of acres of beets per beet raising farm is cut down, as in the Cuthbertson-Boyd and Bird-Welty districts.

(14) At the station Moseley in the Fort Morgan district, the actual distance between the corner of the field and the dump was measured by speedometer.

Seventeen beet-raising farms with more than 2-mile haul average 111 acres cropped land per farm with 40 acres of beets and 7.5 horses or 6.7 horses per 100 acres cropped land.

Sixteen beet-raising farms with 1 to 2 mile haul averaged 82 acres cropped land per farm with 34 acres of beets and 6.5 horses, or 7.9 horses per 100 acres of cropped land.

Fifteen beet-raising farms with less than 1 mile haul averaged 95 cropped acres per farm with 36 acres of beets and 6.5 horses or 6.9 horses per 100 acres of cropped land.

Regardless of length of haul and the acreage of beets

raised, the largest size farm uses the smallest number of horses per 100 acres cropped land.

On farms with more than
2-mile haul, 1 horse handles 5.3 acres of beets.
½-mile haul, 1 horse handles 5.6 acres of beets.
Less than 1-mile haul, 1 horse handles 5.5 acres of beets.

One horse handles only a slightly smaller acreage of beets with a long haul. Of course, the horses must have worked more days unless additional teams were hired during the delivery season.

(15) These statistics do not take into account the weight of the horses kept. It probably could be shown that heavier horses are kept on beet farms with long hauls than on grain or alfalfa farms.

It appears, however, that well-to-do farmers taking pride in their horses, keep heavy and good horses, somewhat in excess of actual requirements.

(16) This is shown by the fact that the average tenant uses less horses for the same cropped acreage than the average owner. The average tenant uses 5.5 horses per 100 acres cropped land; the average owner uses 6.6 horses per 100 acres cropped land, although tenants raise more beets than owners.

Length of the War

Far-seeing men believe that we have just begun to fight, and wise men realize that the only safe policy is for us to assume that the struggle will be long and bitter.

It is vain to ask how long the war will last, for such questioning tempts us to guess, and when we go to guessing our self-interest causes us to guess the best and so to take some chance in effort or sacrifice. All that we know is that we must win.---From address by Clarence Ousley, Assistant Secretary of Agriculture.

Beet Help Responds to Good Treatment

Kind of Beet House and Concessions I Would Furnish Labor on an Eighty Acre Farm, Growing Twenty-Five Acres of Beets

H. H. KNOOP, Brighton, Colorado

E know that in order to get a man to put forth his best efforts we must make his surroundings such as will lead to contentment and not dissatisfaction. One way to do this is to provide a comfortable place in which he and his family may live, provide him with as many conveniences as possible at a minimum cost. On an 80-acre farm with our present crop rotation plan, I consider a beet worker's house a permanent investment, and would therefore lay plans accordingly.

As to the house, I would build it 12 ft. x 12 ft. on a good foundation, comb roof, shingled, drop siding, plastered, good floor, partition it, making a sleeping room and a living room and ample windows. Paint it, by all means.

Now we have a good, comfortable house, one that is warm, and one that will keep out wind, sand and rain. We know what happens to the beet shacks we are accustomed to seeing, constructed as they are with the low, oval roof covered with tar paper. About the second year sees this roofing gone to pieces---torn and flapping in the wind or held down by stones or pieces of discarded farm machinery which is not pleasing to the eye, and the first hard rain we find the interior uninhabitable.

The farmer who provides good living accommodations for his beet help as well as for his monthly man is a progressive fellow and can at all times get the best help to be had. He has the pick of the labor. He need not hunt for help; they will hunt him. I have known German-Russian families to stay with such growers for a number

of years, doing his beet work and are kept throughout the year at other work in season, which is a very good arrangement for both grower and laborer. These Russian families are preferable, I think. The men are usually good at handling teams and can do most all kinds of farm work. They usually have large families and can't, on the first provocation, pull out and leave the farmer when he needs them most, as some other class of labor can.

The other classes of beet labor we have in Colorado, nearly as a whole, will only work at contract labor. When first beet work is finished they are gone, looking for some other contract job. They are no help to the farmer. They don't want days' work, even were they capable of doing it.

As to concessions to be granted to beet workers, I would say that a small garden should be granted them, which is quite an item at this time. If they had some chickens and were willing to provide the necessary woven wire, I would give them the space for their pen. They would have to keep them up until crops were out of the way. Some have their cow, staking her on the road side, which is all right as long as she is taken care of and not allowed to run at large, damaging your crops and your neighbors'. Any hay or other feeds should be paid for by the owner of the cow. Good drinking water is necessary. Sometimes it has to be carried long distances, should the beet house be located some distance from the farmer's house.

I think it is desirable to locate the beet house some distance from your own house. Why not then, put down a well, which can be done in our locality at no great expense? I know that in some localities this is prohibitive on account of the expense it would incur.

Another convenience that could be provided at small cost is a small cellar or dug-out 6x8 or 8x10 feet; the farmer could provide the material for roof and door and the labor will usually be glad to do the work.

The grower should furnish the labor a horse or horses and wagon to haul coal or wood and supplies from town. This usually can be done at such times as on a rainy day or when the soil will not permit working.

There are many small favors the grower can show the labor that cost nothing, which will bring about good feeling and handsome returns, if the labor is of the right kind.

In locating a site for the beet house, if the farmer will spend a little time looking over the farm he will be repaid many times. We are building for permanency, and should we make an unwise selection we may regret it. We should remember this is to be these peoples' home for several months in the year---possibly all the year. Choose as pleasant a place as possible, avoiding ditch banks or low places that are liable to be wet and muddy at some time of the year. Don't build too close to your own house. We like privacy, so do they. There are always children, sometimes quite a number, and if the houses are too close there is sure to be trouble.

Meteorological Report

FOR JUNE 1917 AND 1918

Temperatures:	**1918**	**1917**
Mean Maximum	87.26°	81.70°
Mean Minimum	52.47°	45.80°
Monthly Mean	69.87°	63.70°
Departure from Norm.	+4.47°	—1.40°
Maximum	97.00° on 14th	97.00° on 29th
Minimum	38.00° on 4, 29th	33.00° on 1st
Precipitation in Inches:		
To Date	8.22	8.22
For Month	0.86	0.28
Greatest in 24 hours	0.50 on 21st	0.26 on 4th
Departure from Norm.	—0.68	—1.30
Number of Days:		
Clear	7	16
Partly Cloudy	22	13
Cloudy	1	1

Sugar Supply of the United States

Frank Andrews
(In Year Book U. S. Department of Agriculture)

UGAR consumption in the United States for the five years ending with 1915 amounted annually to 8,000,000,000 pounds, in round numbers. This includes sugar used not only in the household as sugar, but also in the manufacture of confectionery, preserved fruits, condensed milk, cakes and similar products. This total consumption divided by the number of people in the United States gives a yearly average of about 84 pounds for each person, or 378 pounds for an average family (4.5 persons). Computing in like manner, the number of pounds of flour consumed per family in one year would amount to about 1,039 pounds, while potatoes would amount to about 1,000 pounds. On this basis of comparison, taking the country as a whole, the average family consumes more than one-third as much sugar as potatoes or as flour. In other words, for every pound of sugar consumed in one form or other, 2.7 pounds of flour and nearly as many pounds of potatoes are consumed.

When cost is considered, sugar occupies a still more important position. Taking the average retail price of sugar for the five years 1911-1915, 6 cents a pound, of flour 3½ cents, and of potatoes 2 cents, the retail cost of a year's supply for a family of average size would be about $23 for sugar, $36 for flour, and $20 for potatoes. In estimating the retail value of potatoes, however, for the country as a whole, the retail city price would be too high, because approximately one-half of the population is at or very near the source of production. An average between farm value and city retail value of potatoes gives an average of about 1½ cents per pound. This average applied to the family consumption would give about $15 per family as the house-

hold value of potatoes consumed. With this modified reckoning, therefore, flour would be valued at $36, sugar $23, and potatoes $15 in a year's consumption in an average household. In like manner, a year's consumption of butter is estimated (for 1909) as about $23, and eggs at $18. The meat used by an average family may be estimated as slightly over 800 pounds a year (1914), and the retail cost at possibly $200. Milk is consumed in somewhat larger quantities than is sugar, but the yearly cost is probably less.

The figures just quoted emphasize the well-known fact that sugar is a principal item of food both as to quantity and cost. It is so thoroughly recognized that frequent comments are made comparing present status of sugar as a staple food with its status of a few generations ago as a material for flavoring. A century ago the people of this country consumed less than one-tenth as much sugar as they do now. In 1821-1825 the average per capita consumption was 8.3 pounds, and was practically the same 20 years earlier. In 1791-1795 the estimated consumption was only 7.5 pounds per capita.

Increase in Consumption of Sugar

A great change occurred in the consumption of sugar between 1825 and 1850. In the five-year period 1851-1855 per capita consumption of sugar had reached 30 pounds, or nearly four times the figure of 1821-1825. The home production in the later period was more than ten times that of the former, and imports were more than seven times as large. These figures do not include maple sugar, which furnished a large fraction of the supply no doubt in the Northern States. The first census of agriculture, that for 1839, reports 31,000,000 pounds of sugar made on farms in Northern States; this may be assumed to be maple sugar. The total population of the United States in 1840 was 17,000,000, hence the maple-sugar consumption at that time was about 1.8 pounds per capita. During 1851-1855 the home production of sugar nearly equaled

the net imports. Great changes were taking place in the economic conditions in this country in that period. Steam was rapidly coming into use as an important factor. The old horsepower mills in Louisiana were being replaced rapidly by steam-driven mills and by other improvements in machinery. In 1845 there were reported 630 sugar mills operated by steam power and 610 by horsepower. In 1850 there were 907 steam mills and 588 with horsepower, and in 1855 the steam mills numbered 938 and the horsepower mills only 361. This period also marked a high point in the river traffic of the Mississippi Valley. Steamboat trade, of which sugar was an important article carried, had not yet been affected seriously by railroad competition. Railroads themselves were just beginning to be connected so as to form through lines of traffic. Heretofore they had been chiefly local, whereas the great river system was the principal route for freight in the Middle West. In 1851-1855 ocean steam navigation had reached a high point of efficiency compared with earlier years. This development meant larger cargoes, quicker service, and, above all, lower freights. The small vessels of a century ago had to charge relatively high rates compared with the large carriers of later times. Since much of our sugar is carried by water from foreign countries, this lowering of the ocean freights helps to make possible our large supply of sugar and its relatively low cost. These are but examples of a general and rather radical change in economic life in this country, and one of the incidents of this change was that of adding another important food to the diet list of the Nation. Just as cotton became common in household use through the invention of the cotton gin, so sugar was transferred from the list of flavoring materials to that of staple foods by means of improvements in mechanical, commercial, and transport facilities.

Thirty years later than the period just discussed—that is, in 1881-1885—the per capita consumption of sugar had risen to 46 pounds, and the imports had increased from an average of about 420,000,000 pounds in 1851-1855 to near-

ly 2,500,000,000 pounds in 1881-1885. During this period, however, the domestic production had fallen off; our sugar consumption was largely dependent upon foreign supplies.

After another 30 years, in 1911-1915, an average of 8,-150,000,000 pounds of sugar a year were required in this country, or about 84 pounds per capita.

Major Sources of Supply

The principal sources of supply for the sugar consumed in the United States at present may be classified as foreign, insular and continental. The foreign sources supply approximately one-half of the sugar we use; our island possessions, about one-fourth; and our domestic cane and beets, the remaining one-fourth. These fractions are only roughly approximate, as the proportion from each source varies from year to year. During the five years ending June 30, 1915, the domestic sugar production amounted to about 1,873,000,000 pounds; Hawaii, Porto Rico, and the Philippines shipped in 2,130,000,000 pounds; while the imports from foreign countries, after subtracting exports, amounted to 4,147,000,000 pounds, making a total supply of 8,150,000,000 pounds. According to these figures the domestic cane and beet fields supplied 23 per cent of the sugar we used in 1911-1915, the planters of Hawaii, Porto Rico, and the Philippines furnished 26 per cent, while Cuba, supplemented by small amounts from other foreign countries, furnished 51 per cent.

During the five years ending with the season of 1915-16 the sugar consumption of the United States averaged almost 160,000,000 pounds per week. The supply for 27 weeks came from foreign countries, our island possessions furnished supplies for 13 weeks' consumption, while the product of the United States proper was equivalent to 12 weeks' average consumption. The Cuban crop, all but a small fraction of which goes to the United States, has increased greatly in recent years. The crop of 1915-16 was estimated at 6,738,000,000 pounds and was the largest on

record for the island. A still larger output was expected for 1916-17, but an uprising took place which interfered to some extent with sugar making, and the crop, according to early estimates, was from 6,300,000,000 to 6,700,000,000 pounds, the second largest ever made in Cuba.

Hawaii a Good Producer

Of our island possessions Hawaii has the most highly developed sugar industry. There are some 50 mills, practically all of which are large or medium sized, the annual production of a mill ranging from about 4,000,000 to 100,000,000 pounds. The season in Hawaii is long, beginning nominally about October 1 and continuing for a large part of the following 12 months. An average of the running time of all mills is from 180 to 200 days. Nearly all the crop consists of raw sugar and is shipped for refining to San Francisco and to north Atlantic ports. The shipments of Hawaiian sugar to the United States in 1911-1915 were somewhat less than 1,200,000,000 pounds a year. The area of cane in Hawaii, according to the census of 1909, was 183,230 acres, and the total of reports made to the Bureau of Crop Estimates for the season ending September 30 1916, was 246,332 acres---an increase of about 63,000 acres or 34 per cent. Owing to the long growing season for cane in Hawaii only about one-half of the growing acreage is cut each year. The harvest area in the season of 1915-16 was 115,419 acres, or 47 per cent of the total. The yield of cane is heavy in these islands, ranging from 39 tons per acre in 1912-13 to 46 tons in 1914-15, and the cane is high in sugar content, yielding an average of 245 pounds of sugar per ton of cane in the five seasons ending with 1915-16. The average yield of sugar per harvested acre of cane was 10,495 pounds during these five seasons; and the average sugar yield based upon total acreage---harvested and not harvested---was about 5,400 pounds per acre in 1914-15 and 4,800 in 1915-16, or 5,100 as an average for both years together. Hence an acre of growing cane in

Hawaii represents, on an average, a year's supply of sugar for 13½ families.

Porto Rico's Leading Industry

In Porto Rico in 1916 there were 65 establishments for making sugar, of which 37 each produced 4,000,000 pounds or over, 7 produced less than 4,000,000 pounds each, but at least 1,000,000 pounds, while 21 had each a crop of under 1,000,000 pounds. There were 4 large factories or centrals which made in 1916 more than 40,000,000 pounds each and their total production was 350,000,000 pounds, or 36 per cent of the entire crop. Porto Rico's shipments to the United States, which, like Hawaii's, consist almost wholly of raw sugar, furnished in 1911-1915 over 680,000,000 pounds a year. Since the outbreak of the war (1914) the Porto Rican crops have increased greatly. The crop of the season ending in the summer of 1916 was reported officially at 967,000,000 pounds, while the 1916-17 crop exceeded 1,000,000,000 pounds. Porto Rico's average production during the five years ending in the summer of 1915 was 727,000,000 pounds, or considerably more than double the five-year period 1901-1905, and more than five times the average production of 1891-1895. The acreage of cane in Porto Rico increased 40 per cent from 1909 to 1915; the Federal Census reported 145,000 acres in 1909, and the treasurer of the island accounted for 203,000 in 1915. This gain corresponded to a gain ranging from 260,000,000 to 275,000,000 pounds in the sugar crop An acre of cane in Porto Rico yields on an average about 4,500 to 4,800 pounds of sugar. The reported acreage divided into the sugar production for 1916 gives an average of 4,750 pounds per acre; while figures for 1913-14, in reports of 21 factories, give an average of 4,537 pounds of sugar per acre of cane. Hence an acre of cane in Porto Rico represents a year's supply of sugar for eleven or twelve families in the United States.

Until within the last several years Philippine sugar production was confined almost wholly to the small mills of

the natives, and the product was crude sugar of a primitive type. The Philippine government estimates the sugar production of the islands in 1915-16 as 825,000,000 pounds, while the census for 1902 reported a total of about 397,000,000 pounds. Philippine shipments to the United States during the five years 1911-15 averaged about 280,000,000 pounds a year, or about 400,000,000 pounds less than the Porto Rican shipments.

Louisiana Increasing Its Sugar Cane Acreage

The oldest source of our domestic sugar is a section of Louisiana beginning a few miles east of the left bank of the Mississippi river and extending roughly for 100 miles westward, and to the north, from an east and west line passing not far above Baton Rouge, the sugar belt extends southward to the Gulf Coast. Outside of this region cane is grown generally throughout the Gulf states, but there it is used almost exclusively to make syrup and not sugar. Practically the only other cane sugar from our Southern States, outside of this Louisiana region, is made in a few scattered localities in Texas. Cane is said to have been introduced into Louisiana about 1751, and an attempt was made to make sugar eight years later but without success. It was not until 1795 that the first successful sugar mill was erected in Louisiana. The industry was originally part of farming, and the equipment was rather simple, consisting of a set of rollers for crushing the cane and some kettles for boiling the juice. The introduction of improved machinery was followed by a decline in the number of plantations having their own mills.

In 1849 the factories averaged each about 150,000 to 175,000 pounds of sugar for the season; in 1916 the average exceeded 4,000,000 pounds. The factories had increased in size and efficiency, not only producing more sugar but getting more in proportion to the amount of cane used. Within the Louisiana sugar belt cane is by far the most important commercial crop. In the 23 sugar parishes the cane area in 1909 amounted to 16.4 per cent

of the total area of the improved land in farms. The 10 leading sugar parishes showed an area in cane equal to 35 per cent of the total improved land, and corn 33.1 per cent of the total. The large number of mules required in the cane fields makes corn an important product for farm consumption rather than for sale. In the parishes of St. Mary, Lafourche, and Terrebonne cane occupied 41.6 per cent of the total area in improved land, corn 30 per cent, while hay and forage occupied 16.1 per cent. Hence, practically 87 per cent of all improved farm lands in those parishes may be regarded as devoted directly or in directly to the sugar-cane industry. Of the total amount of sugar made in Louisiana in 1916, amounting to 607,800,000 pounds, 238,000,000 pounds, or 39.2 per cent, was produced in the three parishes just mentioned. These parishes contained also 51 of the state's 150 operating factories.

A large fraction of the sugar made in Louisiana is raw sugar, which is sent to the refineries to be refined and granulated; while the rest of the Louisiana product consists of high-grade sugar fit for immediate consumption.

In 1912 the sugar classed as "raw" amounted to 72 per cent of the total output, and the better grades made 28 per cent, according to the Louisiana Sugar Planters' Association. Two years later, in 1914, the higher grades constituted 59 per cent of the total, but they declined to 47 per cent in 1915 and to 35 per cent in 1916. These higher grades of sugar are not all white granulated, but include light yellow sugar.

One of the characteristics of the Louisiana sugar industry is its uncertainties. Cane does not mature there, for the growing season is too short. Cane is harvested before it is fully ripe, and the cutting season is limited to the several weeks beginning about the latter part of October and ending shortly after the cane is killed by frost. Working immature cane results in a lighter tonnage per acre than is obtained in Cuba or other tropical countries, and it also results in a smaller sugar content in Louisiana than in the

The Great Western Sugar Company's Brighton Plant

The Great Western Sugar Company's Brighton Plant

Some Good Sugar Beets, Pulled July 17th

tropics. In spite of these limitations, this state is producing a considerable part of the nation's supply of sugar. The harvested area increased from 183,000 acres in 1915 to 221,000 in 1916, and a further increase was made in 1917. At this rate of increase the area would soon equal that of 1911 (310,000 acres), and the total output of Louisiana would be expected to range from 500,000,000 pounds in a very unfavorable year to nearly 900,000,000 pounds under the best of crop conditions.

Domestic Production of Beet Sugar

The beet-sugar production of the United States is comparatively new, amounting to an inconsiderable total only a generation ago. The industry being new the equipment is modern, and instead of turning out a crude product, as many European mills do, our beet factories make white granulated sugar. Accordingly figures for United States production are in terms of "refined" (pure) sugar. Up to 1891-1895 the average production was slightly below 39,000,000 pounds. Five years later the average annual production (1896-1900) was about 117,000,000 pounds; the next five-year period showed an average exceeding 479,000,000 pounds, and in 1911-1915 beet sugar averaged 1,449,000,000 pounds, or more than three times the yearly average of 1901-1905. This large output in 1911-1915, however, was equal to only about nine weeks' average consumption for the United States. The crop of 1915, the largest beet-sugar crop ever made in the United States, was slightly more than 1,748,000,000 pounds, equivalent to about 11 weeks' consumption. Had the same crop conditions prevailed in 1916 as in the preceding year the crop of 1916 would have been about 2,000,000,000 pounds instead of the actual yield of 1,641,000,000 pounds. Unfavorable weather early in the season followed by further damage resulted in a loss of 103,000 acres between planting and harvesting. The remaining 665,000 acres yielded a poor return, especially in the East, the average yield per acre in Michigan being about 5½ tons in 1916, whereas in 1915 the average in that state

was 9 tons per acre. The beet-sugar factories are distributed over a wide area, extending from northern Ohio to the Pacific coast and from Montana almost to the Mexican border. East of the Missouri river the principal beet-sugar state is Michigan, where two-thirds of the beet acreage east of the Missouri river was located in 1916. This eastern region produced in 1916 about 108,000 tons of sugar, while the region west of the Missouri river produced 712,000 tons. The principal beet-sugar states in the West are Colorado and California, but the industry is also important in Utah, Idaho, Nebraska and Montana. One of the western regions begins on the east with the factory at Grand Island, Nebraska, on the Platte river, and follows that river and its branches, including at its western end factories and fields as far north as Billings, Montana, on the Yellowstone river, and on the south reaching almost to Denver. Another region between the crest of the Rocky Mountains and the Missouri river includes the valley of the Arkansas river from Garden City, Kansas, to the Royal Gorge in Colorado, and extends southward into New Mexico. West of the Rocky mountains the factory at Grand Junction works the beets raised in the irrigated fields along the Grand and Gunnison rivers; a large industry is carried on in northern Utah and southern Idaho; and new fields are being developed in western Montana. In the Pacific northwest are two new factories, one that opened at Grants Pass, Oregon, in 1916, and the other at North Yakima, Washington, in 1917. The California factories are located along the coast south of San Francisco, also in the valleys of the Sacramento and San Joaquin rivers.

There were 17 more beet-sugar factories operating in 1917 than in 1916, of which 14 were new. These new concerns were located at Tracy, Cal.; North Yakima, Wash.; Paul and Shelly, Idaho; Cornish, Delta, Maroni and Smithfield, Utah; Missoula and Hamilton, Mont.; Worland, Wyo.; Brighton, Colo.; Bayard, Nebr.; and Mason City,

Iowa. The factories idle in 1916 which resumed work in 1917 were at Corcoran and Hamilton City, Cal., Janesville, Wis.; and Ottawa, Ohio. One factory which operated in 1916 was idle in 1917.

American Refineries

Nearly all the beet sugar made in the United States comes out of the factory granulated and ready for household use, but imported sugar, the insular crop, and more than one-half of the Louisiana product are sent to refineries before being sold for consuumption. There were 18 of these refineries in the United States in 1914, and their combined product was 6,666,000,000 pounds of sugar or about four-fifths of a year's supply for the nation. The refinery differs from other sugar factories in that it does not handle cane or beets, but merely takes the lower grades of sugar and converts them into higher grades. The working season of a cane-sugar factory is limited by the length of the harvest period and the keeping qualities of harvested cane; and beet-sugar factories, for like reasons, are unable to work more than a few months in a year. A refinery, on the other hand, is not prevented by natural causes from operating throughout the year. The refineries are much larger than the mills that work beets or cane. The average output of a refinery in 1914 was 370,000,000 pounds, or 17 times the average output of a beet-sugar factory in 1916, and more than 90 times the average product of a Louisiana factory the same year. Practically all the refineries are located near the seaboard, for a large part of their raw material comes by sea. Of the 18 refineries reported in the census of 1914, 12 were near the Atlantic coast, 4 near the Gulf of Mexico, and 2 on the Pacific coast.

Minor Sources of Supply

All but a small fraction of the sugar used in the United States is made from cane or beets. Other products contributing to our supply of sweet foodstuffs, however, are worth noting. They include maple sugar and sirup, honey, cane sirup, sorghum sirup, and such cane molasses as is fit for household use. The total yearly production of

these articles may be estimated roughly as about 500,000,000 or 600,000,000 pounds. To this total should be added, if figures were available, the net imports of edible molasses and the net domestic supply of glucose and grape sugar, including corn sirup.

The maple-sugar crop, according to the last census, 1909, was about 14,000,000 pounds and maple sirup production equaled 4,000,000 gallons, which is equivalent to about 32,000,000 pounds of sugar; making the total maple products equivalent to 46,000,000 pounds of sugar. While these figures refer to 1909, it is probable that the annual production has not changed much since then.

The honey crop of 1909 was 55,000,000 pounds, which, added to the sugar equivalent of the maple products, makes a total of 101,000,000 pounds of sweet foodstuffs.

Our domestic production of table sirup made from sugar cane was 23,000,000 gallons in 1909, while molasses, a residual product from sugar making, equaled 25,000,000 gallons. At that time the imports of foreign insular molasses were averaging about 32,000,000 gallons a year, and exports of molasses averaged about one-tenth that amount. The present supply of molasses is probably larger, owing to recent large increases in the importation of low-grade molasses, much of which was probably for use as a raw material in manufacture. In the fiscal year ending June 30, 1917, imports of foreign and insular molasses amounted to 140,000,000 gallons, and our exports of molasses were about 3,000,000 gallons.

No official figures for the total quantity of glucose and grape sugar made in this country are available, but the census for 1914 gives the value of glucose production as $18,541,000 and grape sugar as $3,766,000. No estimate of quantity is given for the former item, but grape sugar production amounted to 174,000,000 pounds. The glucose and grape-sugar production not only goes to meet a general demand in this country, but is exported in large quantities. In the fiscal year ending June 30, 1917, exports of glucose, or corn sirup, were 170,000,000 pounds, and of grape-sugar about 45,000,000 pounds.

Pulp and Other Feeds for Cattle

Results of Feeding Test Made by the Agricultural College at Fort Collins

(From Rocky Mountain News, July 15, 1918)

A HIGH water mark for yearling steers was registered on the Denver livestock market, when $17.25 per 100 was paid by the Coffin Packing Co. for some steers out of a bunch of fifty-four. These steers were purchased from the Colorado Agricultural college and were the ones used for experimental feeding purposes during the last 126 days by the students of the college. The cattle were purchased by Thomas E. Leiper, in charge of animal investigations at the experimental station, at the auction sale at the last National Stock show in this city, for $10.55. The sale yesterday netted $9,292.40, an approximate gain of $5,000 over the purchase price. With the sale of the steers yesterday the third year of experimental feeding was brought to a close.

The steers when purchased averaged 746 pounds. After delivery at the experimental station they were turned into pasture for a few weeks, after which they were divided into six groups and fed specially prepared rations, in an effort to determine the food values of certain feeds. One of the outstanding features was the establishing of the fact that beef cattle can be produced cheaper in Colorado than in the corn belt of the country. Another feature established by **three years of experiments, was the value of sugar beet pulp as a feed in comparison to corn.** "One thing that must be done before we can win this war," stated Mr. Leiper, "is the fact that all grains must be used

for flour and the livestock raiser must quit competing with the woman in the kitchen. **We have demonstrated that better beef cattle can be raised more cheaply in Colorado by feeding sugar beet pulp than can be raised in the corn belt, where grain alone is used for feeding purposes."**

Scientific tests applied to the mixture of rations were used in each of the six groups of cattle fed at the experimental station. The steers were divided into six groups, composed of nine cattle. The weight of each steer in each group was taken when they were placed on rations, and their weights again taken at the conclusion of the 126 days' experiment. The grain was noted and the cost of feeding each animal was tabulated. The shrinkage in transit of each group was taken upon the arrival of the cattle at the market and their dressed percentage was also taken. This averaged more than 60 per cent for all of the steers in comparison with 57 and 58 per cent for pasture cattle.

As a food for beef cattle, the experiment shows that pulp is the best feed obtainable. Corn silage is the next best food, and, although somewhat more expensive, almost as good results are obtained from its use as feed as from pulp. The experiment has shown that in comparison as to **food value, two and a half tons of pulp produce practically the same results as a ton of corn silage.** This result has a two-fold purpose, in that it is necessary for a person to be a grower of sugar beets to obtain the pulp, so that in securing pulp for feed it is necessary that the stock raiser should also grow sugar beets. In this way the acreage of sugar beets could be increased in the state, and at the same time wonderful strides could be made in the production of beef cattle.

The results of the experiments of the six groups, together with their weight at the time of feeding, at conclusion of experiment, shrinkage and selling price follow:

Group 1. Pulp, cottonseed cake, molasses and alfalfa. Weighed 853 pounds when put on ration, 1,147 pounds at conclusion of experiment, showing a gain of 293 pounds.

The shrinkage was 4.9 per cent and the group dressed second in percentage. Selling price, $17.25.

Group 2. Corn silage, cottonseed cake, molasses and alfalfa. Weighed 839 pounds when put on ration, 1,082 pounds at conclusion, showing a gain of 243 pounds. Selling price, $16.25; dressed second and showed a shrinkage of 5.9 per cent.

Group 3. Barley, cottonseed cake, molasses and alfalfa. Weighed 827 pounds when put on ration, 1,060 pounds at conclusion, with a gain of 233 pounds. Selling price $16. Were fattened at the third greatest expense for feed and brought the lowest price of any of the six groups and dressed fourth. The shrinkage was 5.1 per cent.

Group 4. Showing the value of corn silage as a ration in comparison to molasses. Corn silage, barley and alfalfa. The steers in this group dressed the highest and brought $17 on the market. Weighed 822 pounds at start and 1,040 at conclusion of test, for a gain of 217 pounds. Had a shrinkage of 4.7 per cent.

Group 5. Barley and alfalfa. Sold for $16.75. Weighed 843 at start and 1,072 at finish, for a gain of 229 pounds. This group dressed the least, while the cost of feeding was almost twice as great as that of the group fed on beet pulp. The shrinkage was 4.1 per cent. **This test resulted in showing the approximate value of a ton of silage as feed at $12, considered 128 pounds of barley and .297 tons of alfalfa equivalent to a ton of silage.** This figure was reached on the present retail prices of these two commodities.

Group 6. Ration consisted of corn and alfalfa. Market price, $17. Weighed 838 at start and 1,105 at conclusion of test, showing a gain of 266 pounds. The steers in this group dressed third, and showed a shrinkage of 5.7 per cent. This test was to find the relative value of barley and corn as a food, and the average for the three years shows barley having a percentage of 95 per cent.

Pulp is Still Cheap

H. Mendelson

THE price of pulp during the next feeding season is going to be $1.00 per ton during the first four weeks of the campaign and $1.25 per ton thereafter, or 25 cents higher than last year.

There is going to be less pulp than last year, because the beet acreage is less.

In normal times corn and barley could be bought at from $1.00 to $1.25 per hundred pounds. They cost now more than $3.00. It is not expected that this will be less than $2.50 after the coming grain harvest and during the feeding season of 1918-19.

The pulp price in normal times was 75 cents per ton of cured pulp. The present and prospective price of corn and barley is more than 200% of the normal, while that of pulp is going to be 166% of the normal.

In the past and particularly during the feeding season of 1917-18 the demand for wet pulp always exceed the supply, so that our managers have had a hard time distributing the available amount with satisfaction to all feeders.

Steers can be fattened with corn and barley. These grains always have been available at the market price in any quantity wanted.

Nevertheless, feeders were anxious to get wet pulp wherever available.

This, in itself, proves that in the feeders' experiences, wet pulp, at the price prevailing, was the more advantageous food to buy.

The Sugar Company followed in the past the deliberate policy to sell pulp and molasses to our local feeders at a lower price than could be obtained in an open and competitive market. Quite a number of feeders, equipped to operate on a large scale, were always ready to take the

whole output of wet pulp at a higher price than that charged the farmers.

Pulp was undoubtedly a cheap food in the past, and it is still cheap in comparison to other feeds which can be used for fattening cattle and sheep.

Normally steers are fed 100 pounds of wet pulp per head per day. If the pulp costs $1.25 per ton at the pulp silo, and if it costs 50c more per ton to haul the pulp to the feed yards, the total cost per ton of pulp at the feed yards is $1.75, or 8.75 cents per hundred pounds the daily feed of a steer. If corn or barley costs $2.50 per hundred pounds, you can buy 3.5 pounds of it for the same money that you pay for 100 pounds of pulp.

Without going into a scientifical analysis of the two feeds---wet pulp and corn---any experienced feeder will admit that 100 pounds of wet pulp contains more fattening nourishment than 3.5 pounds of corn and 3.5 pounds of barley.

This is, of course, borne out by the analysis of these feeds. According to Henry's "Feeds and Feeding"---the bible of the student of these subjects--- the digestible food contained in 100 lbs. wet pulp is 0.50 lbs. protein, 7.70 lbs. carbohydrates and fat; 3.5 lbs. corn is 0.27 lbs. protein, 2.70 lbs. carbohydrates and fat. Therefore, for the same amount of money, you buy in 100 pounds pulp, 0.23 pounds protein and 5.00 pounds of carbohydrates more than in 3.5 pounds of corn.

The same amount of money spent for pulp gives you twice the amount of digestible protein and more than two and a half times the amount of digestible carbohydrates than if spent for corn.

At the Agricultural college in Fort Collins, experiments have been carried on for the last three years to find the comparative value of various fattening feeds for steers. Pulp, silage, molasses, corn and barley in proper rations were tried on different lots.

Mr. T. E. Leiper, who was in charge of the experiment, in discussing the results of last year's test (as quoted in the Rocky Mountain News), says:

"We have demonstrated that better beef cattle can be

raised more cheaply in Colorado by feeding sugar beet pulp than can be raised in the corn belt where grain alone is used for feeding purposes."

Last year the following rations were compared:

1. Pulp, cottonseed cake, molasses, alfalfa.
2. Corn silage, cottonseed cake, molasses, alfalfa.
3. Barley, cottonseed cake, molasses, alfalfa.
4. Corn silage, barley, alfalfa.
5. Barley, alfalfa.
6. Corn, alfalfa.

The finished cattle were inspected at Fort Collins by a number of experienced feeders, and buyers, from the packing houses. They all agreed on the pulp lot as the best finished. When the steers were actually sold to the Coffin Packing & Provision Company at Denver, the pulp lot brought $17.25 per hundred pounds, the highest of all of them. The same had happened the year before.

The steers selected for these different lots were as even as possible. As evidenced by the dressed carcass all lots carried a beautiful finish. In fact, the buyers declared that the whole lot represented the best finished cattle on the Denver market for several months. This is, of course, proved by the price paid. The lowest price was $16.00, for the lot receiving barley, cake, molasses and alfalfa, considerably more than has been paid for any other stuff on the market for a long time.

These steers were fed the rations quoted above for 126 days. The pulp lot ate less than 6 tons of pulp during this time. They weighed 1147 pounds when sold. They sold for 25 cents per hundred more than the next highest lot, or $2.86 more per steer.

The prices obtained, per 100 lbs., for the different lots were:

	1917	1918
Pulp, cake, molasses, alfalfa	12.25	17.25
Silage, cake , molasses, alfalfa	11.50	16.25
Silage, barley, alfalfa	12.10	17.00
Barley, alfalfa	12.00	16.75
Corn, alfalfa	11.85	17.00
Barley, cake, molasses, alfalfa		16.00

The pound gains made during the feeding period by the different lots were as follows:

	1917	1918
Pulp, cake, molasses, alfalfa	269	293
Silage, cake, molasses, alfalfa	236	243
Silage, barley, alfalfa	257	217
Barley, alfalfa	257	229
Corn, alfalfa	261	266
Barley, cake, molasses, alfalfa		233

In both years the pulp lot made the highest gain, and brought the highest price per hundred pounds.

The details of the food consumed for the lots sold this year have not been published yet. The details for the cattle sold in 1917 have been published.

The food eaten per hundred pounds of gain and the cost of it based on prices for the feeding season of 1918-19 was, for the pulp lot:

3570 lbs. pulp	@ $ 1.75	per ton	$3.12
207 lbs. cake	@ $60.00	per ton	$6.21
138 lbs. molasses	@ $30.00	per ton	$2.07
585 lbs. alfalfa	@ $15.00	per ton	$4.41
	Total		$15.81

The silage lot, compared with this, ate per 100 pounds of gain:

2195 lbs. silage	@ $?	per ton	$?
201 lbs. cake	@ $60.00	per ton	$6.03
161 lbs. molasses	@ $30.00	per ton	$2.41
535 lbs. alfalfa	@ $15.00	per ton	$4.01

Total cost of 100 lbs. gain without silage $12.45

In order to make the total feed cost of 100 pounds gain the same as for the pulp lot, the 2195 lbs. of silage must not cost more than the difference between $15.81 and $12.45, or $3.36, giving a feeding value per ton of silage of $3.06 as compared with pulp laid down at the feed bunkers at $1.75 per ton.

Can you produce corn silage and put it into the feed lot at $3.00 per ton?

The corn lot ate per 100 pounds of gain:

531 lbs. corn	@ $ 2.50 per 100 lbs.	$13.27
876 lbs. alfalfa	@ $15.00 per ton	$ 6.57
	Total	$19.84

100 pounds gain with corn at $2.50 per hundred pounds cost $4.00 more than with pulp at $1.75 per ton at the bunkers.

If the feed cost per 100 pounds gain with corn is to be as cheap as with pulp, at $1.75, you would have to pay $4.00 less for the 531 pounds corn consumed, or $9.27 total, or $1.75 per hundred pounds corn.

In other words, in order to make gains as cheap with corn as with pulp, you must pay about the same for 100 pounds corn as for a ton of pulp laid down at the bunkers.

Pulp is the cheapest feed, and in addition to that, the buyers pay more for the pulp-fed animals than for any of the other lots.

Last year's feeding operations, as carried on by many small feeders, were not profitable.

The feeders were bought at extraordinary high prices, because at the same time the packers were buying the same kind of stuff to fill army demands for light carcasses from 500 to 600 pounds. When the pulp fed cattle were sold there was still no demand for heavier stuff, and therefore no premium was paid for the half-finished material coming out of the farmers' feed yard.

If their cattle could have been held, good profits could have ben made as the market improved considerably since March.

The writer, in the issue of "Through the Leaves" October, 1917, in discussing the feeding situation, said: "If market conditions of this kind prevail, it is evident that more money can be made by putting a higher finish on a smaller number of steers than by selling a larger number half finished. Besides, if the market should go against

you, you or your banker take less chance on the smaller number."

Our farmer feeders have, in the past, followed the system of short-feeding. To a certain extent, the farmer wants to get his feeding operation cleaned up before the spring work begins.

The Sugar Company's cattle are fed much longer than the farmers' cattle. Evidently those in charge of these feeding operations believe that this pays better and results have shown that they are right.

It is a problem to adjust various farm operations so they don't interfere with each other. There would be less work in the spring if there were more fall plowing. If you do fall plowing, you must make up your mind in the fall what you are going to do in the spring. And you must have such a system of cropping that you can have fields for fall plowing.

Another consideration is the buying of the feeder cattle. Many farmers wait until the last minute and then compete with each other in the Denver market for the lean stuff.

Andy Cross is busy for the Sugar Company during the whole summer locating the best buy for the money.

Why cannot the farmer feeders get together and have their cattle bought in good time by some experienced feeder? More money could be made by this method than by cussing corporations like the packers and the Sugar Company.

Poker principles, like coming in a jackpot with nothing in your hand, if the pot is high don't pan out in feeding, because you play the feeding game only once a year.

Good buying is more than half the profit.

Good and cheap feeding is the rest.

Pulp is a good and cheap food, and cheaper than any other food you can buy, including corn silage.

Gleaning the Grain Fields

J. F. Jarrell

ROM time immemorial farmers have gleaned their grain fields in order to save all the crop. Our forefathers cut their grain with a reap hook and when a field was harvested hardly a head of grain was left on the field unbundled.

With the advent of the power harvester and the growing of large acreage, our farmers became careless and millions of bushels of grain have been wasted every year because of this carelessness.

With a shortage of grain confronting us, it behooves every farmer to save every head he can by any means possible. Most grain has been cut for this year. The careful farmer watched his binder so it was working properly all the time.

Now have the pitcher clean up the loose straws when he finishes pitching a shock on the wagon. After the grain is hauled from the field it will usually pay well to rake the field with a hay rake and gather up the scattering heads.

The writer knows a man who raked enough grain from grain fields in one year to buy a 160 acre farm in North Dakota. Some farmers turn the hogs into the fields and allow them to waste the grain which is left. Of course the hogs derive some benefit from what they eat, but they tramp much more into the ground than they eat.

In order to have your fields raked and the grain ready to thresh before the separator leaves your fields it will be necessary to rake immediately behind the haulers or rake all except the shock rows before the thresher comes to your place.

Now and then a separator man refuses to thresh gleanings, saying that stones will get in and break his machine. Of course now and then a stone finds its way into the separator, but the main reason why the separator man does not like to thresh gleanings is that he cannot thresh as

many bushels of it in a given time as he can from bundled grain, thus his pay is a little less per hour. I am sure that during times like the present every separator man will be willing to secure every grain possible from the farmers' fields in order to help whip the Huns through being a little more efficient at his work. It will pay to rake your fields even though you have to feed the grain secured to farm animals in the straw.

Chickens and hogs are good threshers and will earn what you pay to get the grain threshed by eating it from the straw.

Some grain fields may not need to be gleaned on account of their being not enough grain to pay for the labor of doing it, but experience tells us that such fields are few and far between.

If you want to know whether there is enough grain left on your field to pay for raking, just hitch up to the rake and make a few trips across the field and see what you get.

Education, the Keynote of the Fair, Develops Farming

Alvin T. Steinel
Editor Western Farm Life

EDUCATION should be the keynote of every county or community fair. Without educational features no fair is worth holding. With such features, carefully balanced with a share of entertainment and amusement, a fair can become a great benefit to the community it serves. The eye is the most acute mental faculty. What we are taught by means of what we see is learned with ease and retained in memory longer than the impressions coming through the other senses. In the teaching of agriculture, as with other branches of science, visualization is the readiest and most effective means employed. The county fair should be the school where the farm family may, in the shortest possible time and with

the least conscious effort, acquire a knowledge of what the year's crop and farm animal development has been in the community.

On the farm the story of insect damage, the report of smut infection, the complaint of poor seed and a dozen other things vitally affecting the farming business, may pass from mouth to mouth. In this way, however, the spread of knowledge of conditions and methods of combating them, is slow and often inaccurate. If at the county fair farmers may see the results, in graphic exhibits that tell their story to the eye, and impress it upon the brain vividly, it will not be quickly forgotten.

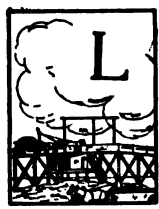
To mention just one of the benefits that may be derived from the educational side of a county fair: We know that our greatest drawback in the wheat sections is lack of uniformity in varieties grown, as well as impurity of type in the same varieties. Unless wheat growers can be brought face to face with an exhibit showing the bad effects of this from the standpoint of revenue, the condition cannot be successfully remedied.

At the properly conducted county fair the farmer is given a comprehensive view of the problems of the whole county and at the same time, he gets a hint as to the remedy and how to apply it. Any crop or farm practice can thus be given attention through exhibits and be made to teach its lesson. This is getting away from the old time practice of trying to outdo our neighbor in producing the biggest squash, or the largest yield per acre under special conditions. Such competition has some good effect, but a fair where this is the main idea is not worth its cost to a community.

We have the farm animal shows of Great Britain and France to thank for the progress of the art of breeding cattle, sheep and horses. The animals themselves tested by well-defined rules, educate the farmers in the business of animal production for milk, or beef, or mutton, or draft power. In applying this principle to crops the educational methods have to be a little more elaborate, but they can be made just as effective toward crop improvement if the fair management is alive to its opportunities.

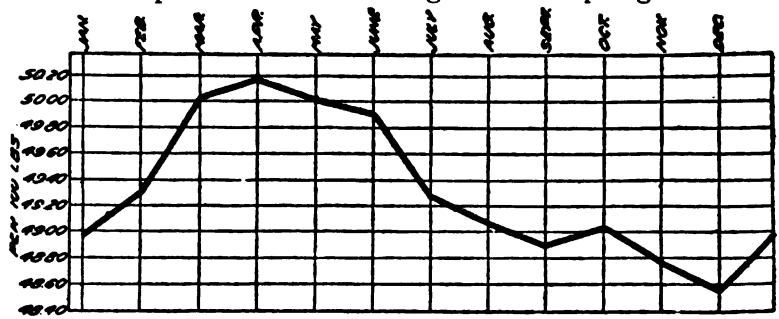
Cycle of Livestock Prices

(From Monthly Crop Report, U. S. Department of Agriculture)

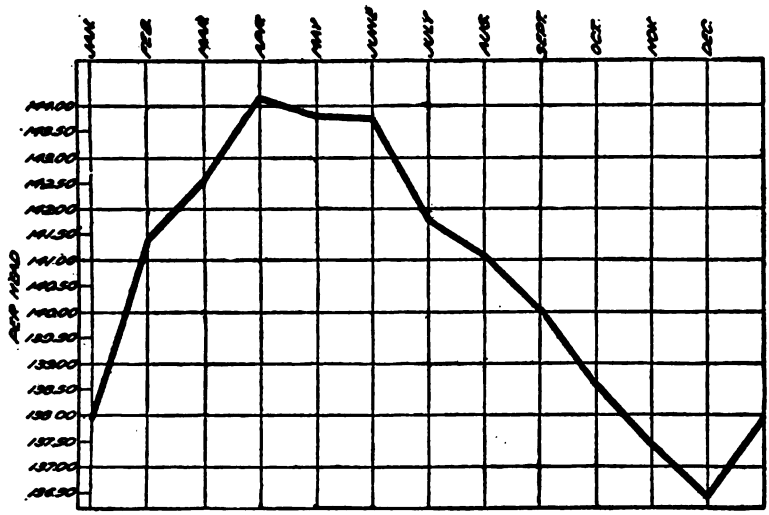


IVESTOCK prices, like prices of most farm products, have regular cycles, normally highest in certain months and lowest in other months. The cycles for the different classes of live stock do not coincide; thus, hogs are highest in September and lowest in December; cattle are highest about May and lowest in December. The following charts show the normal cycle of monthly prices of horses, cows, beef cattle, hogs, sheep and lambs, based upon average level of United States farm prices before the war.

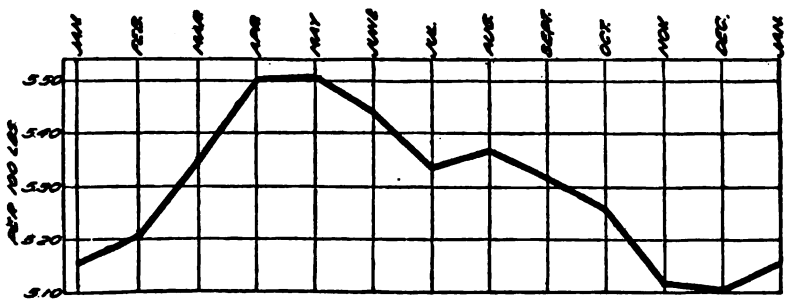
By studying the charts shown one can readily see that many of our feeders are losing money each year by being compelled to ship their fat stuff early. It may be due to lack of feed, shortage of help, small weight gains for the feed consumed or any one of a number of causes which make feeders ship when they do. To a certain extent these causes may be overcome by some planning. An additional filled silo; hay bought and hauled early; siloed beet tops; a supply of dried pulp, may overcome feed shortage along in March and April. Fall plowing, besides being best for most crops, may make it possible to have help to feed a little longer in the spring.



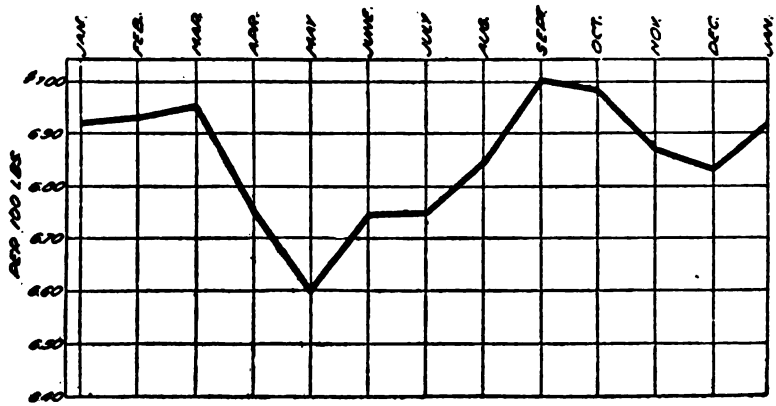
Cows (above), prices highest in April, lowest in December, a slight rise in October.



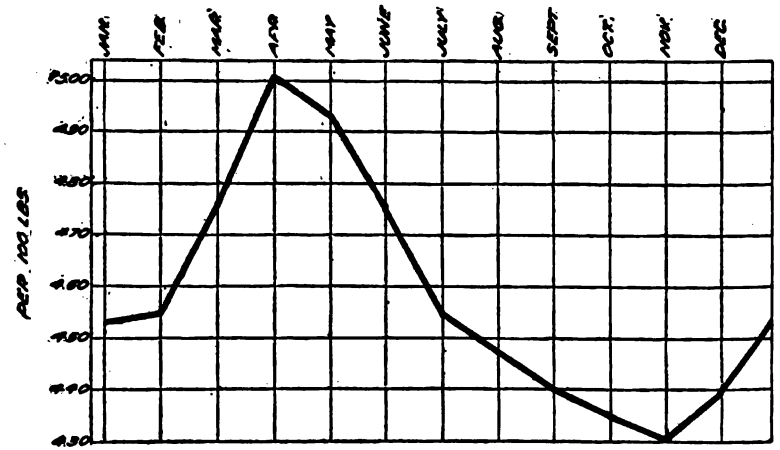
Horses (above), prices highest in April, lowest in December.



Beef cattle (above), prices highest about May 1, lowest in December, a slight rise in August.

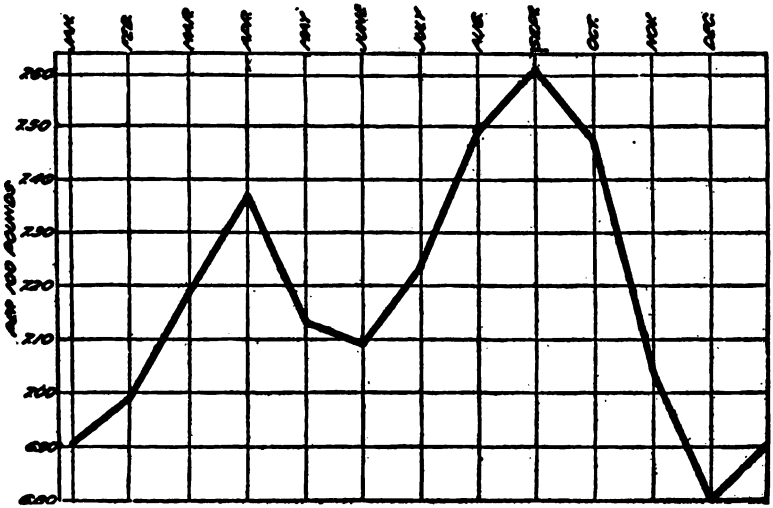


Calves, really two cycles in the year; from highest prices in September prices decline until December, then advance again until March, and decline again to low point in May.



Sheep (above), prices highest in April, lowest in November. Range 16 per cent from lowest to highest.

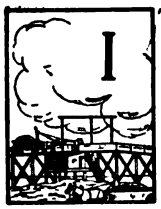
Lambs (above), prices highest about May 1, lowest about November 1. Range 18 per cent from lowest to highest.



Swine (above).—A double cycle. Prices are highest in September and decline to lowest in December, then advance to April, and decline again (after spring farrowing) to June, after which they advance to September. Range from lowest to highest, 12 per cent.

Taking Care of the Binder

Raymond Olney
(From Denver Field and Farm)



IT seems to me that it is not generally realized that on the average ranch machines go to pieces much faster when they are not in use than they do from service. Instead of having a good shelter ready for them when a job is finished a common practice is to haul them under a tree or beside a building somewhere. There they will be left to be destroyed by the action of the wind, rain and sun. Farm machines will stand a great many years of use if properly cared for, but their life is greatly shortened by constant exposure to the weather. The average farmer gets only from one-third to one-half the service from his implements that he ought to do.

I know of no more fitting example than that of the binder. The average life in this dry climate is from four to five years. Some of them last longer and some even less than that. The reason that this average is so low is not so much the severe use which they receive in the field as it is neglect on the part of the owner in not providing the proper shelter for them when idle. In the year 1900 my father bought a binder. He has used it for seventeen seasons. He tells me that in all this time the total cost for repairs has not been over $10. To all appearances it is good for many more harvest seasons. There are two things for which its long life may be accounted—it received careful handling while being used in the field and it was properly sheltered when harvesting was finished.

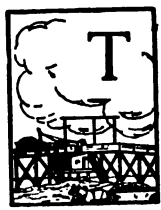
How often we see binders ready for the junk heap after two or three seasons' use. The blue sky is a mighty poor shelter and our brilliant sun and dashing rain are the worst enemies of iron and wood. The thing which should receive first consideration in the care of farm machines is

a good dry shed to protect them from the weather. The life of a machine is increased many times by proper housing and care when not in use. It is not necessary to have an expensive building. All that is required is one that will keep out the moisture and direct rays of the sun. Above all things it should be dry for dryness prevents rust and decay.

The time to make a machine ready for next season is not when you have the leisure to do it. It should be attended to the moment it is hauled from the field after you have finished the job. It is not a wise plan to put it off. If you wait for a more convenient time you are quite apt to neglect it altogether. Other work will come on and you will consider yourself too busy to stop. The consequence is that you have lost a good chance to save yourself a lot of labor the very next time you need it. When a machine is needed is very often when time is most valuable. If it has been neglected the previous year and left to stand out-of-doors considerable time must be spent making repairs and putting it in such condition that it can be used. Often broken parts are found which make it necessary to secure repairs before the machine can go to the field.

The Herd Law

(From the Farmers Exchange Bulletin)



HE so-called "Herd Law" of Colorado is embodied in Section 8 of chapter 92 of the Session Laws of 1917, and provides as follows:

"It shall be unlawful for the owner or owners of any animal or animals knowingly to cause or permit said animal or animals to graze or run at large in any road, lane or public highway that is fenced on both sides with a legal fence."

The penalty provided is a fine of from $10 to $500, or confinement in the County jail not exceeding 60 days, or both such fine and imprisonment, at the court's descretion.

It will be observed that the owner of animals is liable to criminal prosecution not only for allowing his stock to graze or run at large in a public highway, but also in a private road or lane, provided there is a legal fence on each side of such road or lane.

The law further provides that if stock is injured or killed by any vehicle so running at large the owner, driver or person in charge of the vehicle shall not be liable for damages unless the killing or injuring was willful or malicious.

The law does not apply to stock being driven on a public highway in charge of one or more persons.

A legal fence is defined in Section 1 of the act to be a fence not less than 46 inches high, constructed in one of the following ways:

1. A fence of 3 or more barbed wires of not less than 13 gauge, tightly stretched and securely stapled to posts not less than three inches in diameter at the top wire, set not more than 33 feet apart and at least 18 inches in the ground, with a substantial stay or post every 16½ feet, all corner, end and gate posts to be securely braced, the top wire 46 inches from the ground, 2nd wire 14 inches lower, 3rd. wire 12 inches below the 2nd; or

2. A post and board or post and pole fence, with not less than 5-inch posts, set 8 feet apart, with 3-inch boards not more than 8 inches apart, or 4 six-inch boards not over 6 inches apart, securely fastened to each post with nails or otherwise; a three-pole fence with sawed poles not less than 2 inches in diameter at the small end; or

3. Fences of other materials as strong and well adapted to protect enclosures as the above described fences.

The law provides that the words "animal or animals" as used in the act shall include only cattle, horses, mules and asses, and that the words "public highways" shall not include railways or railway rights of way.

All grass growing along a public highway belongs to the owner of the adjoining land, as much so as the crops in his field, subject only to the right of the public to travel or drive stock over it or destroy it in the construction and maintenance of the roadway. The public has no grazing rights on land occupied by a public highway.

Section 3 of the act provides that the owner or owners of any animal or animals breaking through a legal fence shall be liable to the person injured for all damages done by such animal or animals and that the trespassing animals may be taken up and held for security for the payment of such damages and costs; but that no person shall be allowed to recover for damages to crops unless the same is protected by a legal fence.

Plan Now For Next Year's Wheat Crop

(From Colorado Agricultural College Bulletin)

It is time now to think of planting wheat for next year, that is, for the 1919 crop. The United States government asked Colorado for an increase of 20 per cent in the wheat acreage for 1918. The state responded with nearly 30 per cent increase.

"The wheat crop in some sections of the state has suffered because of drouth," says Prof. Alvin Kezer, of the Colorado Agricultural College. "On the whole, however, the crop offers an excellent prospect of success.

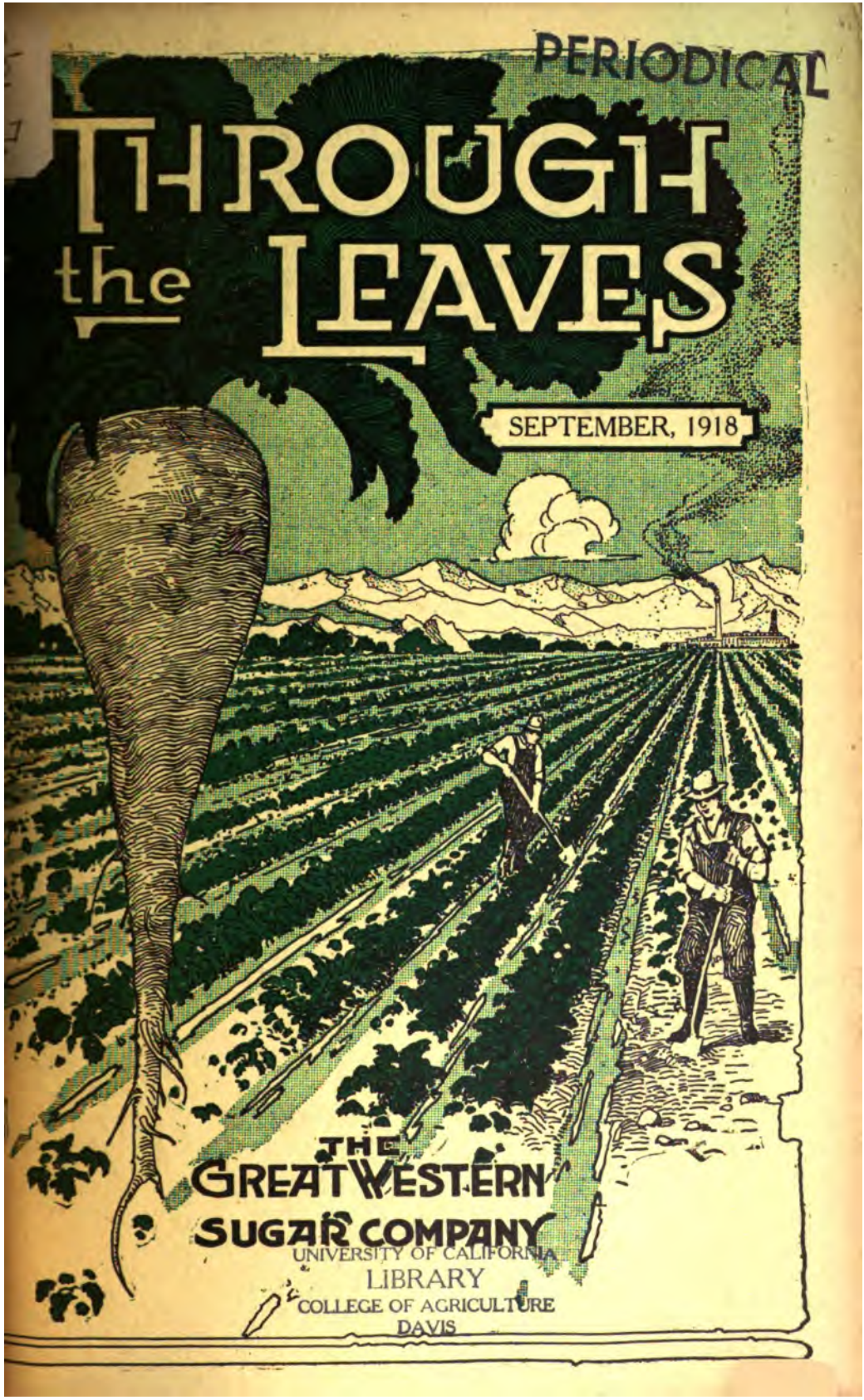
"Growers should plan to maintain nearly this year's acreage and even to increase this year's acreage except in those sections having lands adapted for the production of sugar beets. Wheat and sugar are both essential crops. Some of our lands are better adapted for the production of sugar than the lands of other regions. These should be utilized for sugar production, but where there is no conflict between sugar and wheat, the wheat acreage should be largely increased.

"Food will continue to be a deciding element in the war. Excess acreage must be planted to insure a safety supply. Now is the time to plan for that excess."

PERIODICAL

THROUGH the LEAVES

SEPTEMBER, 1918



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THROUGH THE LEAVES

SEPTEMBER, 1918

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1918

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NOTES

N. R. McCreery

HE rains that have been so much in evidence during August seem to be of a very general nature. We hear of them in South Dakota, Montana, Nebraska, Wyoming and all through Northern and Eastern Colorado. All over these sections they have interfered with the grain and hay harvests. In the bean districts the blight has struck very heavily and probably has been helped along by the frequent showers and hot weather. Reports that have been received show that in most of the heavy bean-growing sections not more than half a crop will be harvested. These rains, on the other hand, have helped the beets and the general outlook is for a good yield this year. Web worms and hail have visited many fields in some districts, while others have been comparatively free. Some agriculturists report no success from spraying while others have had a complete success. We are convinced that if the spraying is done in time and a fine spray obtained by a sufficient continuous pressure that the spraying will prove effective. Occasionally we find a grower who refuses to spray his field. We are unable to understand his methods of calculation. The cost per acre for spraying is not more than $2.50 and the loss from severe visitation of worms is not less than one ton per acre besides the loss in food value of the tops that are destroyed.

There is so much hay all over this country that has been damaged by the rain that the amount available for baling and shipping is very small indeed. The alfalfa mills will probably be able to grind up and dispose of a limited quan-

tity but home feeding of this product is the way most of it will be used and is the way to make it bring the best returns.

+ + +

As we learn of crop conditions over the various factory districts and see the individual returns many are getting, we are more firmly convinced than ever that the farmer who follows out a practical, consistent crop rotation is much better off over a period of years than the man who tries to chase the pot of gold that appears to be within easy reach by following some single crop with a temporary high price. This may be done occasionally, but cannot be persisted in without a decrease in subsequent yields and an occasional crop failure.

+ + +

FALL PLOWING

I know that with the large amount of work ahead of each one of you, this subject must be touched upon lightly. But knowing the great benefits to be derived from having this work done in the fall, we cannot refrain from emphasizing its importance. The advantage of early planting was never more noticeable than this year. Any plant (whether beets or not) that has to get its start during the hot days of June, does not make the growth that the plant does that is well rooted during the early growing months of spring. This is particularly true of the beet that must have its growth more or less disturbed by the thinning process.

Fall plowing will not only put the ground in better physical condition to induce growth, but by reason of its being already prepared it can be planted in proper season.

+ + +

We presume that there is scarcely a sugar factory that does not have more or less difficulty with the distribution of the pulp. The great demand for the product is an evidence of its value as a feed and also of its relative cheapness as compared to other available feeds. Each of these

factories have studied the matter over carefully and outlined certain rules governing its distribution. These rules are for the direct benefit of the growers in order that as equitable a distribution as possible may be had. Whenever any grower or growers attempt to evade these rules and obtain more pulp than they are entitled to receive, they probably feel they are putting one over on the Sugar Company; but they are really beating their neighbors out of just that much pulp. Did it ever occur to you that the Sugar Company will have just as much money for that pulp whether John Jones gets his full share or whether John Smith hauls out part of John Jones' pulp? Play fair with your neighbors and then insist that they play fair with you.

\+ + +

BEET TOP SILAGE

It is now time that you should plan to take care of your beet tops. From Idaho and Utah, from southern Colorado and even from many growers in our own territory, have come reports of values obtained from beet tops far in excess of anything we have ever expected. Twenty-five dollars per acre is a low return to be made from siloed tops, and estimates as high as forty dollars, and even fifty dollars per acre, have come to us. With big demand for feed and high prices prevailing, it is an economic waste to the whole country not to make this by-product of your beet fields return its utmost value. We know if you give it a fair trial you will be satisfied to continue.

We have no particular choice between the two methods of curing. Either as ensilage in a pit or in a rick with straw. But the wasteful method of pasturing in the field should by all means be discontinued. You who want fertilizer, should have a bunch of cattle fed in a feed lot, hauling in your straw for bedding and these cured tops for feed.

Beet Tops

H. Mendelson

EVERY year by this time we publish some information in this magazine concerning the value of beet tops, because there are still some farmers in every district neglecting to get the maximum amount of food out of them, obtainable under existing conditions.

An ordinary acre of beets will produce at least two tons of dry beet tops and about 1200 pounds of dry pulp if the pulp is dried. If the pulp is sold wet out of the silo, about 7000 pounds of it are available per acre of beets.

The dry substance in the beet tops is much more than that in the pulp. It is therefore, more important to use beet tops fully and rationally; especially, as pulp, dry or wet, is not available to every farmer.

Everybody who has fed beet tops admits they are a valuable food. However, exactly what value beet tops have and what trouble and expense a farmer can and ought to go to obtain the maximum value seems to be an unsettled problem.

On the one hand we have the cattlemen trying to buy beet top pasture at $3.00 per acre and on the other hand a cattlefeeder states that the profits from his siloed beet tops are larger than from the whole beet crop. Some dairymen state that beet tops are worth $20.00 per acre to them, but these same dairymen refuse to pay more than $6.00 per acre for another farmer's beet tops.

We know that a steer can be kept on an acre of normal beet top pasture for about 100 days with some increase in weight. This steer if fed on alfalfa hay alone, would eat at least 20 pounds per day or about one ton during the 100 days. Therefore, under those conditions, one acre of beet top pasture is at least worth one ton alfalfa, or at present prices about $12.00. The hay has to be hauled to the steer at the expense of some labor or money, while the steer helps himself to the beet tops.

On this basis, an average acre of beet top pasture has a minimum value of $12.00.

Others claim a high value for beet tops as fertilizer. It is, however, clear that most of the fertilizing value of beet tops is returned to the land if they are pastured and presumably in a form rendering them more quickly available to the growing crop than if they were plowed under.

In many beet fields where beets are grown after beets, we find during plowing undecomposed parts of last year's beet leaves, just as we find undecayed alfalfa roots in land broken from alfalfa sod a year ago. Therefore, a large part of the fertilizer value of beet tops is realized by pasturing them, and to say the least, valuable hay, representing labor and money, is saved.

The prevailing practice among steer feeders and dairymen is to pile the tops in small piles. This is done in many instances by the labor topping the beets immediately after topping at the cost of a small additional payment. In this case, it is necessary to see to it that the piles are not too big, else the tops under unfavorable conditions have a tendency to rot or to become moldy.

In some cases the tops are piled a few days after topping to give them a chance to dry somewhat. The tops are picked up by a fork and shaken in order to remove adhering dirt. It is claimed by some farmers that this practice improves the feed value of the tops considerably. If the tops are damp when piled, undoubtedly a great deal of dirt adheres to them, which is, of course, of no food value.

The piling of the tops is done in many cases even where animals are pastured. It is claimed that the animals do not waste so much by trampling it in the ground. In case of snow, the animals can get at the piles much better. We have had several times in the last ten years, snow preventing the grazing of unpiled beet tops.

A large number of cattle feeders and dairymen haul the tops from the piles to the feed yards, limiting the animals to a given amount each day. This practice seems particularly necessary in case of dairy cows.

The sheepmen in the Fort Collins district seem to prefer pasturing of green and unpiled tops. An acre will provide food for 50 lambs for 15-20 days, according to Mr. Griffin, at Fort Collins. He states, "It is preferable to feed the tops by turning on the fields at a time when the crowns are still comparatively tender and hence readily eaten. If preserved in piles the crowns become hard and difficult for the sheep to chew and if hauled to the yard in this condition the sheep will pull them through the racks and trample them under foot, which entails as heavy a loss of feed as when the tops are fed in the fields."

This is indeed an objection to all dried beet tops. The crown is probably the most valuable part of the top and frequently becomes as hard as leather, making it doubtful whether the animal---sheep or steer---gets really the full benefit of it.

This objection is overcome if beet tops are siloed. The practice of siloing is increasing slowly. The difficulty is that it takes men and teams during beet harvesting time in addition to those needed for harvesting and delivering the beet crop. However, some farmers, making a business of cattle feeding on a large scale, evidently think it pays to silo tops and therefore have some men and teams during beet harvesting time doing nothing else but haul tops from the field to the silo.

There is another consideration in favor of siloing. As far as we know, cattle are not fattened or finished on hay and dry beet tops alone. This is explained by the analysis of dried tops, showing them to be a feed similar in character to alfalfa hay and relatively deficient in fat producing carbohydrates.

In other words, dried beet tops are an unbalanced food and have to be combined with something containing starch or sugar or other carbohydrates to make a fattening ratio.

If beet tops are siloed, a fermentation takes place, which creates some acid and decomposes proteins, the meat-making part of the food, into substances more nearly related to carbohydrates. Therefore, siloed beet tops are an entirely different food from dried beet tops. Instead of hav-

ing a feeding effect like alfalfa hay, they have a feeding effect more like wet pulp or corn silage, although not the same as wet pulp.

The dry substance of the wet pulp is more digestible than that of dried, or siloed or green beet tops. In other words, since the animal's stomach has only so much room, if it is filled with beet tops it will hold less actual and available nourishment than if filled with wet pulp. This means that if beet tops form the bulk of the food, the gain in live weight per day will be less than if the bulk of the food is given in form of pulp or other more concentrated feeds.

The influence of a bulky ration on the daily gain was clearly shown in steer feeding test made at Fort Collins last year, where pulp and silage were compared. The steers got all they wanted to eat, but the pulp-fed steers made a higher daily gain than any of the lots receiving corn silage.

About 80% of the beet pulp dry substance is digestible,
About 70% of the corn silage dry substance is digestible,
About 50% of the beet top dry substance is digestible,
About 57% of alfalfa dry substance is digestible.

Observant practical feeders agree that the amount of beet tops to be fed daily has to be limited and supplemented with other feeds. Our agricultural superintendent at Scottsbluff, Mr. Heldt, states that the steers seemed to thrive best when they get from 17-20 pounds dry tops per head per day, of course together with pulp, molasses and hay.

The siloing itself is simple enough. A trench has to be made wide enough for the wagon to drive through and deep enough to get the necessary depth of tops. The tops are unloaded into the pit and the team driven over them to pack them. The packing must be done well to avoid air spaces, where the silage may mold. After the silo is filled it is best to cover it with straw. The silage is fermented in a short time. It should be taken out in vertical sections. Some farmers have had success in making alternate layers of straw and tops. Others did not suc-

ceed by this method. Therefore, it is just as well to feed the straw separately.

The depth of the siloed tops should be at least four feet.

Our total knowledge of the utilization of beet tops may be summarized as follows:

The minimum amount of food with minimum expense is obtained by pasturing beet tops.

This practice is being rapidly abandoned by good farmer feeders, except in the Fort Collins sheep feeding district.

Cattlemen buying a large acreage of beet top pasture at a rather low price prefer this method.

Piled beet tops cured in the field and hauled to the feed lot give a much larger amount of food. For maximum daily gains the amount fed per head per day should be limited and supplemented with more concentrated food of a starchy nature, like wet or dry pulp, molasses or grains.

Siloed beet tops are a food different from dry beet tops and may take the place of wet pulp or corn silage to a certain extent.

Siloing beet tops probably produces the maximum amount of palatable food per acre of just the kind we need to supplement our main roughage, alfalfa hay, where pulp and molasses are not obtainable at all or in insufficient quantities. But this method demands more labor and trouble than any other method.

Beet tops in any form, whether green, dry or siloed, are to be considered as roughage, as only 50% of the dry substance is digestible. For maximum daily gains they have to be liberally supplemented by more concentrated food. But due to their cheapness, economical gains can be made and the animal put in good condition if fed long enough.

At any rate, farmers should realize that beet tops represent a large amount of valuable feed which should be properly taken care of, especially at this time when feeds are high.

The value of the beet tops should not be forgotten when figuring the returns from the beet crops.

Beet Top Silage for Breeding Cattle

Chas. F. Schaale
Of The Tomkins Cattle Company

THIS is the era of food conservation. While the efforts of the government officials seem to be exclusively along the line of conservation of food for the human family, the high price of feeds is forcing the feeders to give the subject of animal food conservation considerable thought.

The question is being answered throughout the corn growing states by the increased use of the silo. While good silage was looked upon in the past largely as a succulent feed for dairy cattle, feeders all over the country are beginning to realize that good silage can be made a large part of a well balanced ration.

Our feeding operations consist of feeding ten to twelve hundred head of pure-bred yearling and two-year-old Herefords through the fall and winter months to be used exclusively for breeding purposes in the spring. Therefore, our problem is much more complicated than that of the person who feeds for the market alone and whose sole aim is increased weight. We feed for growth, weight and quality, as all three are taken into consideration when pricing a breeding animal.

Last season for the first time beet top silage became a part of our regular ration and with such success that this year we have doubled our beet acreage. We had in last year less than fifty acres of beets, ten acres of which were very poor, both in stand and yield. We siloed the tops in two stacks as follows: The first stack we put a layer of tops on the ground about eighteen inches deep, then a layer of straw about ten inches deep, the succeeding lay-

ers of tops and straw were about ten inches deep and the stack was topped out with two feet of straw built up in the center to shed rain. This stack, when opened, was found to be in fair condition, except the bottom layer which was badly rotted and the outside edges of which were frozen.

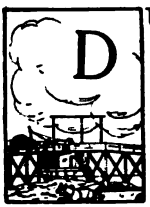
The second stack was put up as follows: First a layer of straw six inches thick, followed by ten inches of beet tops and six inches of straw. The beet tops were thinned out toward the edge of the stack, so that the entire outside edge of the stack was clean straw. The entire stack was built up in this way with alternate layers of straw and beet tops, all being well tramped down. The stack was finally topped out with three feet of straw. When this stack was opened it was found to be in prime condition, with the tops and straw all one color, very black, and it smelled like plug tobacco. Cattle took to it like a pup to warm milk.

We were feeding at that time five to five and one-half tons of ground alfalfa per day in a morning and afternoon feed. We split the ration in half, feeding beet top silage in the morning and ground alfalfa in the afternoon, with cotton cake. The two stacks lasted fifty-five days. Or, in other words, we saved conservatively two tons of alfalfa for fifty-five days, or a total of 110 tons of hay.

We paid seventeen dollars per ton for alfalfa in the stack last year, so that placing our beet acreage at fifty acres and our saving of hay at 110 tons our beet tops showed a value of $37.40 per acre. By the addition of these beet tops the rest of the ration was relished much better and the entire herd never was in better health, for, as a matter of fact, we did not have a single sick animal during the entire feeding period. Just what would be required, if anything, to make the ground alfalfa, beet top silage and cottonseed cake a perfectly balanced ration, I am not prepared to say at this time, but will know before the end of our next feeding season.

Corn and Beet Silage

H. H. Griffin



URING the last three or four years many silos have been built in northern Colorado, which speaks well for the agricultural prosperity of this section. It is a step in the right direction It has been demonstrated that with proper attention to soils and to selection of varieties of corn Colorado can raise from ten to fifteen tons per acre. Silage is especially desirable for the production of milk and beef.

To handle the corn crop as silage requires a considerable investment, which is not always forthcoming, especially on farms worked by tenants, as most landlords will debate for some time before agreeing to place a silo on a farm for a tenant. Corn is a splendid crop to put on alfalfa breaking; it does not need to be planted until the middle of May, at which time the alfalfa has made considerable growth, which may be plowed under, thus adding a valuable fertilizer. The field is easily prepared; the alfalfa that may grow during the season is not at all troublesome. The alfalfa plowed under and the cultivation of the corn put the land in fine condition for beets the succeeding year. Cutting the corn low for silage takes away the objectional feature of the corn stubs. In fact, corn for silage and beets supplement each other nicely, not only as regards their place in rotation on the farm, but as an adjunct to each other in feeding operations. To emphasize this feature is the object of this paper.

I feel the attention of our growers should be called to some features in regard to the keeping of the beet tops, which has not been done. The beet growers have not realized what a valuable by-product they have in the beet tops and not nearly enough attention has been paid to caring for them.

Beet tops can be preserved for future us either in the

form of silage or in the dry state like hay. When thoroughly dry they may be stacked and protected from the wet or they may be kept in small piles in the fields. Very little loss will occur in this manner if the winter is dry; should the weather conditions be wet the loss may be excessive. In the dry state the crowns, which are the most valuable part of the feed, become so dry that they are not readily eaten by stock. Hence, the most desirable way to keep beet tops is in the form of silage. Siloing the beet top is of more interest to those farmers keeping a limited number of stock the year round, than to the large feeders.

I wish to call attention to two ways in which the green tops may be kept for silage.

1. Dig a pit in the ground in some place where the drainage is good, from three to five feet deep and from six to ten feet wide and of the length required to hold the crop grown. Into this pit haul the green tops, driving through the pit and over the tops as they are put in, which will thoroughly pack them. When filled cover with a little straw and dirt to exclude air. The pit can be opened at one end, taking out the desired quantities for feed each day.

2. The green tops may be stacked in a rick on the top of the ground, preferably next to a tight fence or a wall of some kind. The rick may be of any width and length that will most conveniently handle the crop. Do not put straw or any material with the tops, as the heavy green tops by themselves will settle much better and exclude air; only a very small portion around the outside will spoil.

Mr. Chas. Wetzler of near Fort Collins called my attention last spring to some silage that he had kept by this method and which as late as May was in splendid condition.

The first method is preferable, in that the green tops are handled easier by throwing downward in the pit, than if pitched on the surface and there is some less waste by spoiling on the top and sides. The second method has advantages in that it appeals to the man who is not expecting to remain on the farm long and, therefore, wishes to

incur as little expense as possible, or to one who may have rather seepy or wet conditions near where he wishes to feed.

About 35% as many tons of beet top silage can be secured from a crop of beets as there are tops of beets harvested. This means that from an acre of beets nearly one-half as much silage can be procured per acre as from a crop of corn and yet have a beet crop besides. Furthermore, there is not the heavy investment for silos and putting the crop into them, a feature which makes this silage readily available for the tenant and for the farmer who does not feel able to build silos.

Being able to have such a vast amount of splendid feed available at such a low cost is a feature of the beet business that we have been overlooking and one which, if taken advantage of, will still further add to the benefits to be derived from the successful growing of beets.

Feeding Beet Pulp to Lambs

(From "Facts About Sugar")

The results of some experiments in feeding lambs conducted by the Michigan Agricultural Experiment Station, in which concentrates were fed with dried beet pulp and molasses beet pulp, are reported by Dr. W. E. Taylor in a recent paper on the feeding value of beets for live stock. It was found that dried beet pulp is equal in feeding value to the same amount of corn, and that molasses beet pulp is no more valuable than the beet pulp dried.

Lot 1 was given .7 pound of corn, together with linseed meal, bran and clover hay. Another lot was given .7 pound of dried beet pulp with the same amount of linseed meal, bran and clover hay. Both lots made same gain. Another lot received .9 of a pound of molasses beet pulp instead of .7 pound of corn, together with the linseed meal and clover hay, and made practically the same gain.

More About Beet Tops

E. H. Huelskemper

FROM time to time articles dealing with the handling, storing, feeding and food value of beet tops have appeared in this booklet. Following are some extracts from some of the articles, which in addition to the articles on this subject appearing in this number should help a man to decide how he will be enabled to get the most out of the tops from his beets.

All writers seem to agree that feeding the tops in the field, just as the beet toppers leave them, is the most wasteful and unsatisfactory way of feeding them. Most of the writers agree that siloing or stacking the tops, with, or without straw, or salt, will enable feeders to get the most value out of the tops.

When we have clear and dry weather, the danger of having feed snowed under at a critical time is not always thought of. After the big snow in the winter of 1913-14, W. R. McClellan wrote. "Recently I heard of a party having fifty steers and hauling fresh tops to them. When he found the tops under two feet of snow he has, for a week, been feeding them 1912 tops and straw he carried over. . . . If every farmer now having cattle and depending on beet tops, had siloed with straw one-half of his tops, what a blessing it would have been, and then. if you don't feed them all you can carry them over, like hay."

Mr. R. C. Kibbey, of the American Beet Sugar Co., in June, 1917, wrote: "The cost of siloing tops is comparatively slight, ranging under ordinary circumstances from $1.25 to $2.00 per ton. This includes the initial cost of excavating the silo, the value of the tops, the straw and salt used and the cost of hauling to the silo and filling."

Mr. H. M. Sieman, in September, 1916, wrote: "If you should come across a man who claims that he took good

care of his beet tops and says it does not pay to bother with them you had better investigate and find out how he handled his tops and how they were fed so you will not make the same mistake."

Mr. H. Mendelson in an article on this same subject, in October, 1916, wrote: "A desirable quantity of manure cannot be produced unless the beet tops are hauled to the feed yards."

In the same article Mr. Mendelson says: "Around Johnstown where they make money from dairying, tops were fed as late as May this year. . . .an acre of beet tops, according to care and the yield, furnished all the succulent feed for one cow from 100 to 200 days." Referring to last year's feeding operations at the Scottsbluff factory, under the supervision of Mr. Heldt, he writes: "The steers ate on an average of 18.5 lbs. of dry tops per head per day. Mr. Heldt stated that the steers liked to eat more tops, but if allowed to they did not gain as much as when limited to a certain amount."

"The yield of green tops of a normal field may be assumed to average about 75% of the weight of the beets."

Mr. Geo. E. Holmes, foreman of the Ballard farm, Merino, Colo., wrote in March, 1914: "When properly cured there is no tendency to scouring in stock such as we have at times by feeding fresh, green tops. . . . I believe that one acre of siloed tops, with alfalfa will fatten one steer and make it fit for the block."

These extracts all tend to show that proper handling of the beet tops not only pays for the labor, but gives additional value to the tops. In nearly every one of the articles referred to some mention is made of siloing the tops. Usually a pit silo is referred to. In regard to silos for beet tops, Mr. H. H. Griffin, agricultural superintendent at the Fort Collins factory, says: "Form the pit so as to have the least amount of tops in contact with the soil, the deeper it is, the better. A depth from four to five feet will be satisfactory. It should have good drainage." To this might be added that the pit should be made so that a wagon may be driven over the tops as they are put in

so as to pack them as much as possible. Mr. Holmes, part of whose article has already been quoted, says: "As with all silos, it is very necessary that the tops be thoroughly packed or tramped in so that all air is excluded and as soon as completed the top should also be sealed." Mr. Kibbey in his story, adds: "This is especially true of the edges where the tops come in contact with the walls, so that no air can enter from that quarter. The filling may be continued during the whole topping season." A complete layer of tops should be added each day, if this is done. C. W. Strauss, in Nov., 1917, says: "A good job of filling the silo will usually make it necessary to cut the tops out in blocks with a broad-axe."

In several of the articles the addition of salt to the tops is mentioned. Mr. J. A. Brock, in "Facts About Sugar," writes: "Attention is called to the fact that by the addition of 1% of common salt the conservation of siloed leaves may be increased." Three pounds of salt per ton of tops is also mentioned.

Mr. Kibby, comparing beet top silage and corn silage, gives the following figures:

	Beet Top Silage	Corn Silage
Moisture	64.36%	68.50%
Ash	9.25%	1.51%
Crude Protein	2.87%	3.12%
Crude Fat	.44%	.80%
Crude Fiber	5.46%	6.53%
Nitrogen Free Extract	17.62%	20.54%

Mr. Mendelson, comparing beet tops and alfalfa hay gives this table: "The dry substance of the tops consists of about:

Digestible protein	10.5%
Digestible fat	1.2%
Digestible carbohydrates	36.0%
Digestible fiber	7.0%

Ordinary alfalfa hay analyzed by the same methods, contains, according to Henry's Feeds and Feeding:"

Digestible protein 10.6%
Digestible fat 0.9%
Digestible carbohydrates 27.0%
Digestible fiber 12.0%

He sums up by saying: "The composition of the dry substance of beet tops somewhat resembles alfalfa hay, although it may not have the same food value."

As to final results, Mr. Kibbey undoubtedly voices the opinion of all who have siloed beet tops successfully when he says: "The results of feeding beet top silage have been exceedingly satisfactory and economical. . . ."

Sugar Land Should Not be Planted to Wheat

(From Colorado Agricultural College Bulletin)

"The government is asking Colorado to increase its wheat acreage in 1919 at least 10 per cent. By all means this should be done to assist in protecting our food supply," says Prof. Alvin Kezer, of the Agricultural College.

"Colorado has some of the best wheat lands in the United States; it also has some of the best sugar beet lands in the United States. It so happens, that the best sugar beet lands are also very strong producing wheat lands. Sugar is even scarcer than wheat. Our best irrigated beet land should be kept in sugar beets because of the sugar shortage, the wheat increase should come on the lands not adapted for sugar production.

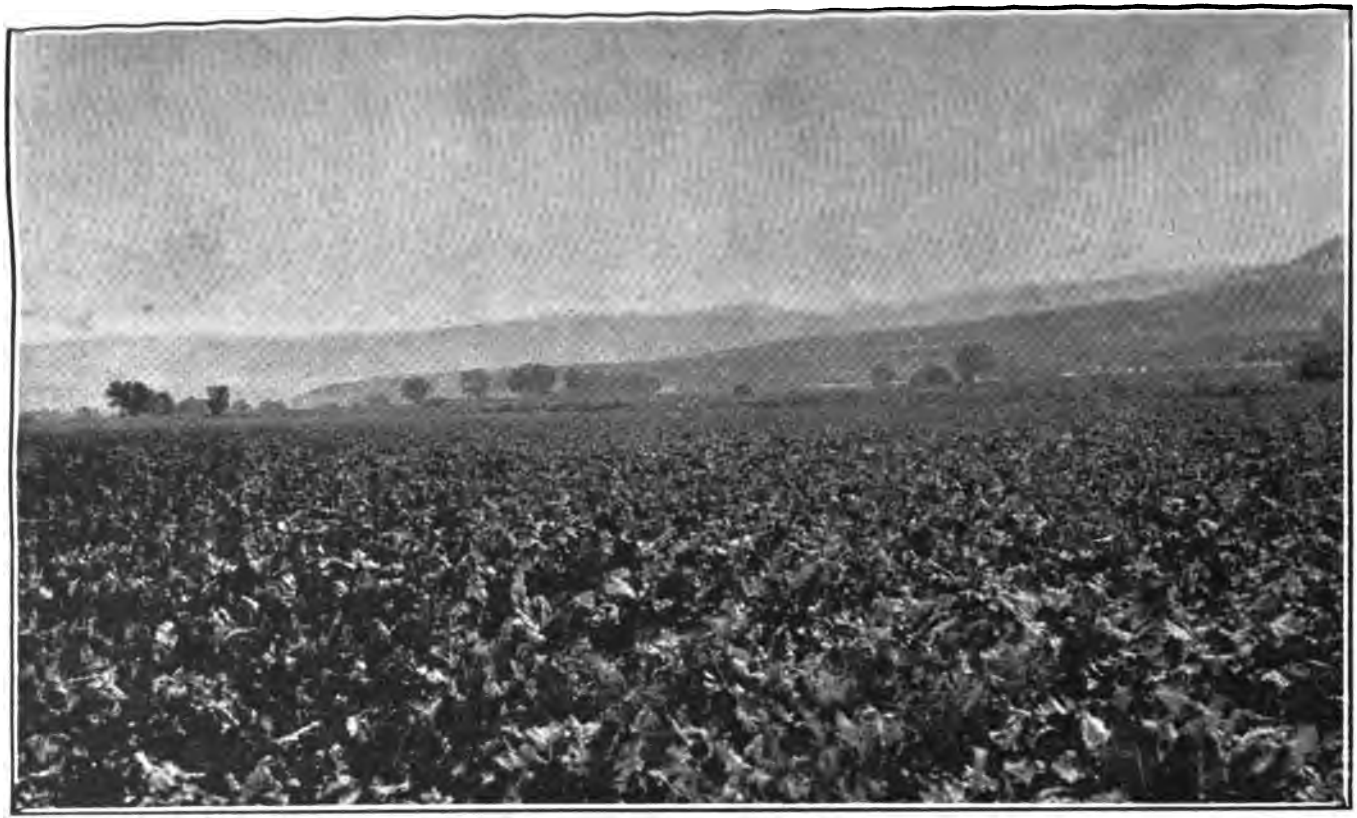
"The government is asking Colorado men to go into the army; it is asking Colorado farmers to produce wheat and sugar. Good sugar beet lands should grow sugar; they will produce more food per acre in sugar beets than they will in wheat.

"The government will make arrangements for necessary laborers. Of course, individuals may suffer from labor shortage but the industry as a whole will be taken care of."

Harvesting seed on the Windsor farm. This gang contains 47 men, women and children and is one of four similar gangs operating at the same time on this farm.

Harvesting seed on the Windsor farm. This gang contains 47 men, women and children and is one of four similar gangs operating at the same time on this farm.

A twenty-ton crop of beets in the shadow of the Rockies; also a lot of good feed.



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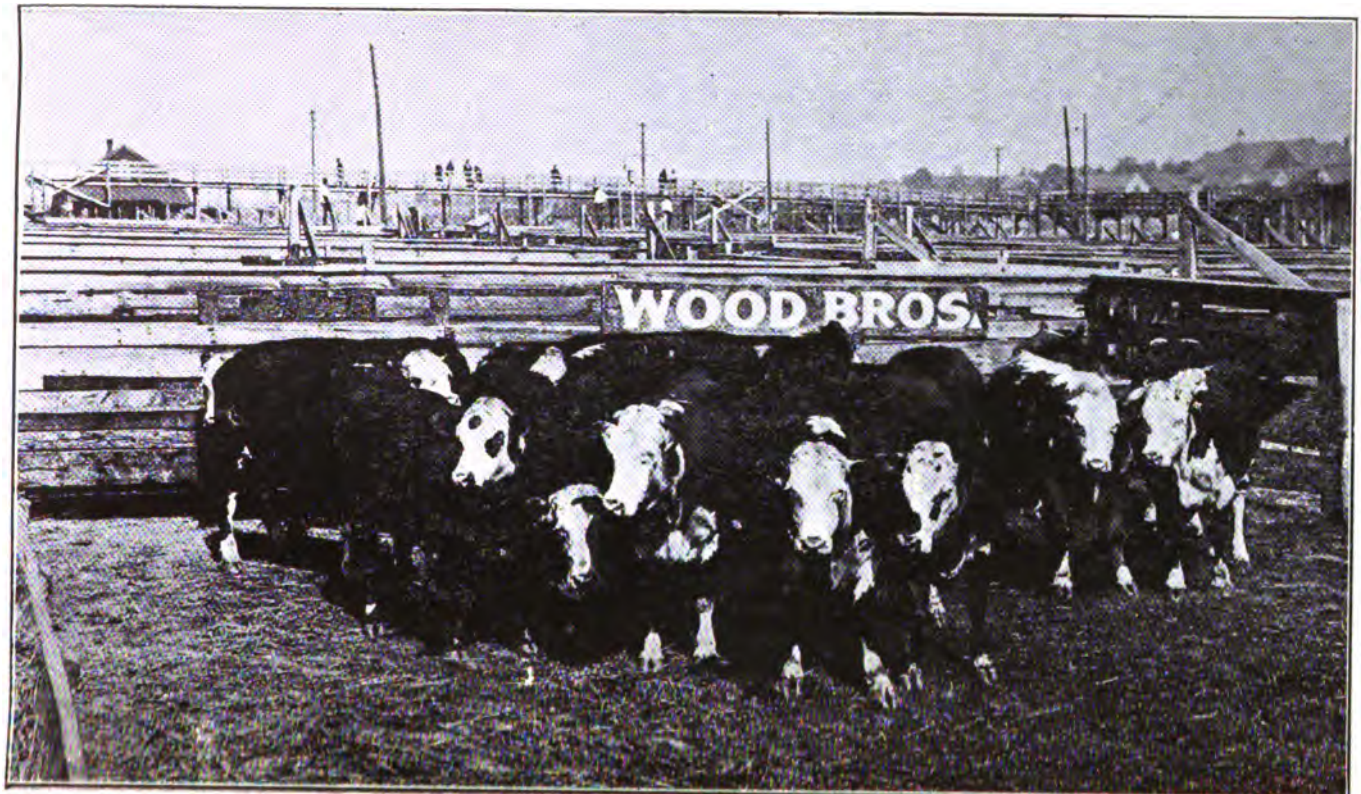

WOOD BROS.

To have been the "highest priced beef steers ever sold on any open market" is the distinction claimed for the steers shown on the opposite page. These were southern branded Herefords; coming four-year-olds; double wintered in Colorado and were fed for a period of not less than seven months each before being placed on the market. They were fed wet beet pulp, alfalfa hay, cotton seed cake and syrup, averaging the season through about 100 lbs. pulp, 12 lbs. hay, 2 lbs. cotton seed cake and 4½ lbs. syrup per day.

They averaged 1,339 pounds and brought $241.00 gross per head. Wood Bros., Omaha, sold these cattle for the Fort Morgan factory of the Great Western Sugar Co. at $18.00 per cwt., June 13, 1918.

A good finish due to a long feeding period is in part responsible for the exceptional price. Feeding a smaller number for a longer period might prove profitable for many feeders who have been feeding large numbers for a short period and sending half finished stock to the market.

Beet Top Silage Will Help Solve Pulp Shortage

(From Colorado Agricultural College Bulletin)

LTHOUGH sugar beet pulp has proven the best beef and money maker in the three-year experiment just completed, few of our feeders can secure enough pulp to finish their cattle for market.

"One reason why the feeder has not realized more money on pulp-fed cattle is because he has not been prepared to feed them long enough to really fit them for market," says T. E. Leiper, of the Colorado Agricultural College."On the other hand, present prices of grain and general market conditions do not warrant much success to the short, heavy concentrate fed cattle.

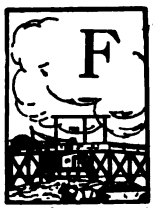
"As the allotment of pulp will probably be based on the tonnage of beets instead of the acreage, the proper crop rotation and use of manure will assure the feeder a better proportion of pulp this fall. The average beet raiser has from 20 to 30 acres in beets which under normal conditions should allow him 100 tons of pulp. As one steer requires from 5 to 6 tons on 120 days feed, this amount leaves the feeder short 2½ to four tons per steer provided he feeds two car loads, or 50 steers.

"If left to air dry, the tops should yield 2 tons per acre and at the rate of 40 pounds per head per day should furnish feed for 40 days. This still leaves 30 days feed to be provided, and undoubtedly at an increased cost.

"A 13-ton yield of beets will make over 4½ tons of beet top silage per acre, or 20 to 30 acres at least 100 tons, which will more than carry the two car loads to a satisfactory finish. The problem of supplying horses and labor at the particular time required to make tops into silage is perplexing and often impossible of solution. However, under present prices and conditions of livestock feeds there is no substitute that can be secured that is as economical and satisfactory."

Fall Work

JOHN COMER, Seed Superintendent



ALL plowing, except in very sandy ground, is a very decided advantage to any crop to be planted in the spring, whether grain, beans or beets.

Fall plowed land absorbs all moisture during the winter. Even following a dry winter it can be worked into a good seed bed if the little showers we have every spring are properly taken advantage of.

If you fall plow you can plant your crops earlier in the spring. More poor crops are caused by inability to plant in time than by any other cause. Not only wheat, but barley and oats yield much better if planted early. Also it ripens earlier and gives you a chance to have your threshing done on time and have the land ready for fall plowing.

Grain fields should be double disked immediately after harvest whether you want to plow in the fall or in the spring. This will preserve moisture and the plow can do better work.

Alfalfa sod should be crowned very shallow and after the crowns have dried should be replowed.

If you cannot plow yourself, it will pay to hire somebody else to do it.

On all the Sugar Company's farms we aim now to have all plowing done in the fall and we would do this regardless of the crop raised with perhaps the exception of potatoes on soil fitted for potatoes.

If land is inclined to blow it ought to be ditched before winter comes . It also is an advantage to irrigate any fall plowed land if you can. The wet soil will freeze during the winter. Freezing and thawing improve the texture of the soil.

Fall irrigating should not be done by flooding, but by ditches.

Beets can be irrigated with safety up to the fifteenth

RANGE OF PRICES, 1917-18 STOCK FEEDING SEASON

Denver market prices when stockers and feeders were bought:

1917	Tops	Bulk
Sept. 15-30	$10.95	$9.17-$10.35
Oct. 1-15	11.03	9.25- 10.29
Oct. 16-31	10.95	9.29- 10.21
Nov. 1-15	11.40	9.20- 10.33

Denver market prices when the resulting beef cattle were sold:

1918.	Tops	Bulk
Jan. 15-31	$11.65	$10.45-$11.15
Feb. 1-14	11.90	10.50- 11.40
Feb. 15-28	12.30	10.82- 11.80
Mar. 1-15	12.46	11.16- 12.06

Pulp feeders are, of course, mainly interested now in prices likely to be obtained for their product when they sell it. A conservative feeder may assume that prices for pulp fed cattle turned out during January and February, 1919 are going to be only a little higher than those obtained during these same months in 1918.

THE NATION'S CROPS

Crop	Est. Yield 1918	Actual Yield 1917	Actual Yield Av. 1912-16	Ex. of 1918 over 5-yr. av.
Corn (bu.)	3,159,836,000	3,159,494,000	2,761,252,000	398,000,000
Wheat (bu.)	890,930,000	650,828,000	809,345,000	81,000,000
Oats (bu.)	1,436,617,000	1,587,286,000	1,296,406,000	140,000,000
Barley (bu.)	229,816,000	208,975,000	201,625,000	28,000,000
Rye (bu.)	81,604,000	60,145,000	44,547,000	37,000,000
Potatoes (bu.)	405,507,000	442,536,000	361,753,000	44,000,000
Sweet Potat's (bu.)	92,119,000	87,141,000	63,541,000	29,000,000
Rice (bu.)	43,373,000	36,278,000	28,851,000	14,000,000
Sugar beets (tons)	6,247,000	5,980,000	5,972,000	275,000
Beans (bu.)	19,791,000	14,967,000		4,824,000
Hay (tons)	101,642,000	94,930,000	95,371,000	6,271,000

COLORADO PRODUCTION OF STAPLE CROPS

	Est. July 1918	Final 1917
Winter Wheat (bu.)	9,056,000	7,728,000
Spring Wheat (bu.)	5,967,000	5,808,000
Oats (bu.)	10,961,000	11,134,000
Barley (bu.)	5,903,000	5,544,000
Corn (bu.)	10,788,000	10,640,000
Potatoes (bu.)	7,850,000	9,310,000
Rye (bu.)	410,000	432,000
Beans (bu.)	2,679,000	1,188,000
Beets (tons)	1,474,000	1,858,000
Peaches (bu.)	660,000	1,200,000
Apples (bu.)	650,000	701,000
Hay (tons)	3,113,000	2,836,000

Meteorological Report

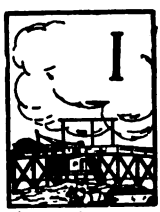
FOR JULY 1917 AND 1918

Temperatures:	1918	1917
Mean Maximum	83.32°	88.2°
Mean Minimum	54.26°	52.2°
Monthly Mean	68.79°	70.2°
Departure from Norm.	—0.91°	+0.50°
Maximum	96.00° on 2, 31st	98.00° on 24th
Minimum	45.00° on 1st	46.00° on 1st
Precipitation in Inches:		
To Date	13.23	9.72
For Month	5.01	1.50
Greatest in 24 hours	1.63 on 9th	1.32 on 26th
Departure from Norm.	+3.07	—0.26
Number of Days:		
Clear	6	4
Partly Cloudy	24	27
Cloudy	1	0

Does Beet Labor Respond to Good Treatment?

The Experience I Have Had the Last Four Years With Russian Labor

CHAS. SNOW, Lafayette, Colo.



I HELD the same deluded ideas as Mr. Knoop (Through the Leaves, August, 1918) that the better surroundings one would give beet help the more they would appreciate it and consequently give better work. But let me say that so far as being honest or appreciative, in the language of the little boy, "There ain't no such animal." This year I was able to try out the theory I held, namely, that the better treatment you gave them, the better work they would do, and it has been knocked higher than Gilroy's kite.

I gave my help a good five-room house, all the garden ground they could take care of, pasture for a cow, plenty of room for chickens, fire wood enough to last nearly all season and made arrangements for a merchant to deliver groceries to the door at no extra expense.

And what do I get for it? Not a whit better work in the beets, a lot of insolence, and if I ask him to help at any other work on the farm he expects me to pay him more than he can get from other men four or five miles away.

I think that the Sugar Co. should insert a clause in the labor contract that the beet help must help do other necessary farm work at a reasonable price. I at least intend to have such a clause in my beet labor contract.

Common humanity demands that you provide a house that will keep the women and children warm and dry, also plenty of water for house use. But after four years'

experience with Russian beet workers I know that the only safe way for the grower is to be in a position where he can force them to do the contract work strictly to the letter for nine-tenths of them will slight the work if you give them a chance. You simply can't treat them as you would like to treat people you have around the place, for, if you tried that it wouldn't be thirty days until you would be living in the shack and the Russian would be joy-riding in your "flivver."

Fall Plowing

F. M. Baker

DOES it not look as if in these times of the shortage and high price of farm labor as though we were overlooking a large factor that would reduce the producing cost of beets ---that is, fall plowing?

If you follow a proper system of rotation on your farm so as to keep up its fertility, which on these high priced lands has become a necessity, you should have some land that could be plowed in the fall for beets the following year. There is always a time before beet harvest that most farmers could, if their rotation of crops were worked out on the right system, have some ground that could be irrigated and plowed for beets. Take stubble land, for instance. If that could be disked and then irrigated as soon as the crop was off the ground, in a short time there would be a considerable after growth which, if plowed under, would secure good decomposition of vegetable matter to help enrich your land.

Fall plowing will also be a great help in the eradication of weeds and insects with which we have had a considerable experience this year.

Another thing, on the ground fall plowed you will get the full benefit of winter action upon the soil, allowing you to plow deeper, thereby bringing more of the subsoil to the

A twenty-ton crop of beets in the shadow of the Rockies; also a lot of good feed.

20 years and still can be used for harvesting grain. Proper housing and proper handling made that binder last several times as long as it would have lasted had it received the usual slip shod care.

Machinery takes up considerable space as we all know, but by a sensible arrangement the machine shed can be made so very little space is wasted. Lay out your plans to fit a certain layout of machines, do not build without carefully calculating the area needed to store what you wish to store, figure on double decking, using the lighter pieces, such as plows, harrows and mowers for the upper deck and it will pay you well in the end to have a good machine shed.

"Never Again!" Cries Farmer Who Did Not Treat Seed

(From Colorado Agricultural College Bulletin)

Never again!

A certain farmer looked over his field of smutted wheat in which from 15 per cent to 20 per cent of the heads were black with smut. The loss was serious, not only for him, but for his country.

"Did you treat your grain before planting?" was the inquiry.

"No," was the reply. "I thought the seed was clean and did not treat, but---never again!"

It will not cost more than two or three cents per bushel to treat the small grains. Hence, considering the low cost of treatment, the farmer can ill afford to use anything but clean seed.

Seed treatment can be done any time during the year if certain precautions are taken.

Colorado Looks to 1919 to Recover Lost Acreage

(From "Facts About Sugar")

HILE some disappointment is felt in sugar circles at the relatively poor acreage showing made by Colorado this year, it is realized that this is due to entirely exceptional circumstances. The uncertainty that prevailed as to the contract price to be paid for beets, the appointment of a commission to investigate this subject at so late a date that its report could not be rendered until after the time when most farmers had laid out their plans for the season, and the high returns promised by other farm crops which are not handicapped by the restrictions as to price which prevails in the case of sugar, are recognized as unfavorable factors which together made it impossible to maintain the sugar acreage of the three preceding years.

It is regarded as particularly unfortunate that the decline should have come this year, since it is evident from estimates recently published as to supplies for the coming half year that the country will have need of a large beet sugar output in order to carry through to the end of the year without a serious scarcity. In view of this condition particular attention is being given to the matter of reclaiming the lost ground during next season and, if possible, providing an increased production of sugar more in keeping with the country's requirements under war conditions.

Colorado always has been proud of her position as a leading beet sugar producing state of the country, and the farmers in the principal growing sections here have had sufficient experience with the sugar beet to understand its cultural requirements and its stimulating influence upon other crops grown in rotation with it. It is

felt that even here, however, attention has been confined too largely to the direct cash return from the crop in estimating its value and too little to the importance of utilizing its by-products in promoting a well-balanced scheme of agriculture.

In view of the need for increased meat production and of the demonstrated high feeding value of sugar beet tops and pulp for live stock, plans are under way to encourage more general concentration upon the combination of sugar beet growing and stock feeding, to which Colorado is well adapted. In this connection a sugar man of long experience with conditions in this district said today:

"It is noteworthy that in the past ten years the consumption of sugar in the United States has increased at the rate of 120,000 tons a year, while the average increase of beet sugar production has been only 30,000 tons a year or one-fourth the increased requirements. To have supplied our national increased consumption of sugar with beet sugar would have required approximately 85,000 acres additional each year planted to sugar beets, and to have sustained this increased acreage would have meant an increased well-balanced farming throughout the Rocky Mountains of an area of approximately 340,000 acres.

"If the United States increases its consumption of sugar at the same rate during the next twenty years that it has during the past decade, we shall have to meet at that time an increased annual consumpion of 2,600,000 tons of sugar. To meet this increase would require 1,730,000 acres of land constantly in beets each year, or 6,920,000 acres of well-balanced farming to sustain this annual beet acreage. The acreage necessary to meet our annual increased consumption of sugar at the end of twenty years will, at the same time, furnish live stock feed for approximately 2,595,000 head of cattle.

"The question for the American to determine is whether this indispensable agricultural crop, and the accompanying advantages of the enormous amount of cattle fed, to-

gether with the enhanced production per acre of other agricultural products, shall be produced in the United States by the free American farmer, or whether the almost incalculable direct and general economic benefits shall go to a few capitalists and a great mass of the lowest form of labor beyond the borders of this great republic."

Keep up Production

(From "Facts About Sugar")

The decision which must shortly be reached as to the price to be established for sugar during the coming year is of momentous importance not only to the sugar industry itself, but to the welfare of the nation as a whole. Evidence steadily accumulates that the production of sugar in the United States will continue to decline unless a wholesale price is set that will cover the rapid increase in costs of production and stimulate the industry to overcome the many other difficulties by which it is faced. The labor shortage, the lack of fertilizer, and the aggressive campaign being waged to extend other crops which are less severely restricted in the matter of price, as well as the mounting cost of materials and labor, are handicaps against which the domestic sugar industry must contend.

Under existing conditions, with the sugar ration limited to less than half the normal rate of consumption, no argument is necessary to prove the importance of maintaining the home production of sugar. It would be a poor service to consumers to throttle the progress of American sugar production and to decrease still further the available supply in order to effect a possible saving which at the most can amount to only a few cents a year in the case of each individual. It is safe to say that every consumer would prefer a situation in which he could obtain three or four pounds of sugar at twelve cents a pound to one in which he was limited to two pounds at nine cents.

Pulp Proves Superior to Corn Silage in Feed Test

(From Colorado Agricultural College Bulletin)

For the purpose of determining the feeding value of wet sugar-beet pulp and corn silage, two lots of 10 steers each were placed on feed March 6, 1918, and fed 126 days at the Colorado Experiment Station at Fort Collins.

Lot 1 was fed as follows: 82.8 pounds wet pulp, 2.99 pounds cottonseed cake, 3.87 pounds of sugar beet molasses, and 7.66 pounds of alfalfa at a cost of $10.04 per hundred pounds gain not including the cost of haul of pulp. When laid in the lot they averaged 853.9 pounds and cost $91.79 per head. They gained 2.327 lbs. per head per day and passed the scales at an average final weight of 1,147.2 lbs. The average cost of feed per head was $29.45 making a total cost of steer and feed of $121.24. They were sold in Denver at $17.25, or $188.22 per head, and returned a margin of $66.98 over the cost of feed and initial cost of steer. The shrinkage in transit of 13 hours was 4.9 per cent and when hung on the hooks they dressed 61 per cent.

Lot 2 was fed as follows: 22.96 lbs. corn silage, 2.99 lbs. cottonseed cake, 3.88 lbs. sugar beet molasses, 9.35 lbs. of alfalfa at a cost of $13.93 per hundred pounds gain. The average initial weight was 839.2 lbs. and cost $90.21 per head. They gained 1.931 lbs. per head per day making a final weight of 1,082.6 lbs. The average cost of feed per head was $33.91 making a total cost of steer and feed of $124.12. They brought $16.25, or $165.39 per head, and returned a margin of $41.27 over the cost of feed and initial cost of steer. They shrank in transit of 13 hours on cars 5.9 per cent and dressed 59.5 per cent.

From 2½ to 3½ tons of pulp are required to give the same gain as a ton of corn silage. There was 18½ per cent difference in daily gain in favor of pulp.

Sugar Beets Require Deep Plowing

Prof. G. E. Bensel
(From "Sugar")

THE preparation of the land to be cropped to sugar beets is a very important operation and many past failures can be attributed to the lack of sufficient attention given to the plowing.

If a sugar beet raised from high-pedigreed ancestors, well shaped parents with a pivoting root, will encounter a compact soil lacking porosity, viz.: difficult to penetrate, it is easy to understand that the shape of the young plantlet will differ from its inherited tendency, and that its development, its form, its richness, will be strongly modified.

The object of the thorough preparation of the soil is to furnish to the sugar beet a medium in which it can freely develop all the qualities transmitted by its ancestors.

Deep plowing is the first principle of successful beet culture, because the root is thereby enabled to penetrate the sub-soil with no obstruction, thus preventing its growth out of the ground, and also allowing it to extract considerable nourishment from the soil.

Deep plowing means a deeper and better feeding surface for the beet. By plowing deep we pulverize a greater quantity of soil, bringing to the surface a large portion of dormant plant food, which, by the action of atmospheric agents, such as air, moisture and light will soon become available and, consequently, increase the fertility of the soil.

Furthermore, deep plowing will considerably increase the water shortage capacity of the soil, which is a very important work, especially in the semi-arid regions where the average rainfall does not exceed sixteen inches, and

where the precipitation occurs only during the winter season.

By plowing deep the water will percolate better and more moisture will be stored. By deep plowing is meant 14 to 18 inches deep—depths which should be reached gradually by increasing the depth 2 to 4 inches every year, until the desired depth is obtained. (Professor Bensel refers to California conditions).

If the land has been plowed only 8 inches deep, the next season it should be plowed 10 to 12 inches, and so on. Unbroken land (or grain land), which has been plowed only very shallow should be plowed about 8 inches the first year in order to avoid bringing up to the surface a too large amount of dead soil. New and unbroken land can be plowed 16 to 20 inches deep for the first time, if the land is to remain fallow for one year. During this time the air will bring life to the virgin soil by transforming the insoluble plant food into a soluble form, which also stimulate the bacterial activity and leave the ground in an excellent condition for the sugar beet crop.

Deep cultivation not only increases the fertility of the soil but opens the land to the atmosphere; it facilitates the penetration of the oxygen; the absorption of the air moisture; helps the decomposition and assimilation of nutritious elements.

Besides all the above mentioned advantages, it has a destructive action on the larvae of injurious insects. Furthermore, the spores of the leaf-spot will be killed if plowed under to a depth of 12 inches. Deep plowing is the most practical remedy against the leaf-spot; therefore, all fields that were affected by this fungous disease should be plowed as deep as possible.

If the land was farmed to sugar beets the previous year, and by plowing out the beets the ground was left in a very rough condition (as often occurs in heavy soil), it is very advisable to have the land rolled and disked before plowing in order to prevent the turning under of big clods which will create open spaces in the subsoil which are so detrimental to the sugar beet.

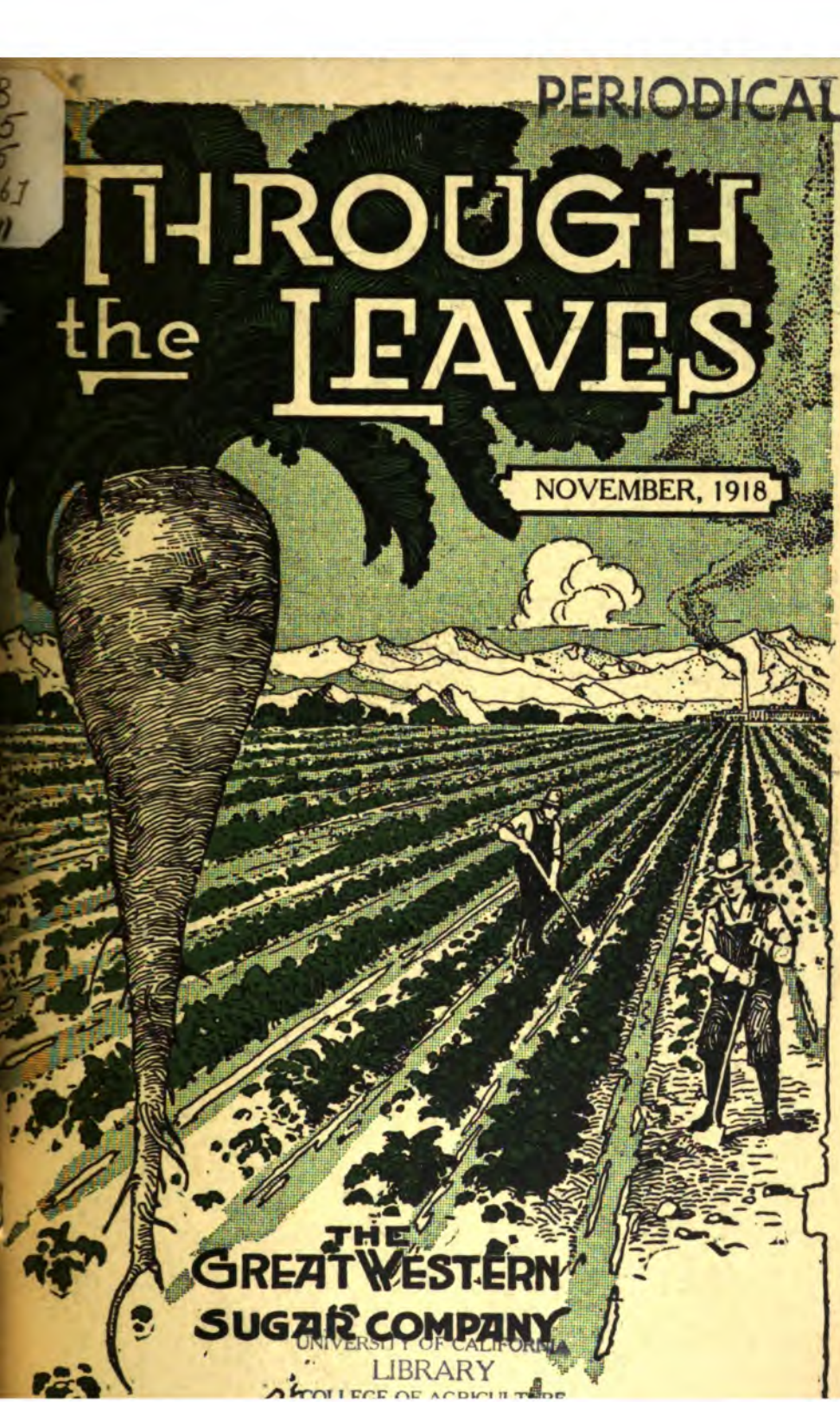
All the land to be farmed to beets should be plowed as early as possible; this does not mean that the land should be planted early, as the date of planting depends greatly on the nature of the soil; its chemical composition, etc. Four to six weeks should elapse, at least, between the plowing and planting, especially if a new soil is brought to the surface by deeper plowing.

With the daily increasing use of the mechanical tractor in the beet fields, the growers have intensified their method of farming---by plowing their lands deeper and quicker, which means a greater storage of rain; a larger feeding surface for the root system; a better supply of plant food and more efficient action of the atmospheric agents, all conditions which will considerably increase the growers' profits.

PERIODICAL

THROUGH the LEAVES

NOVEMBER, 1918



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Published Monthly by
THE GREAT WESTERN SUGAR CO.

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LONGMONT, COLORADO
1918

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Both Are Doing Their Part in the Great Conflict.

NOTES

N. R. McCreery

HEN the harvest was completed last year we thought it scarcely possible to have another season as good, but this year has been fully equal and growers everywhere have taken advantage of this condition to rush their harvest. From present indications most growers will be through about November 1st. This should give an opportunity for a large amount of fall plowing. With the shortage of labor existing, there is nothing that will help so much to get the crops in at the right time in the spring as a goodly acreage of land prepared in the fall. Besides, your fields will be better for the winter action on the soil.

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We wish we were able to emphasize the value of fall plowing to the extent that every one would get at least enough land plowed this fall for their beet acreage next spring. Every one is desirous of saving labor and also producing maximum crops. There is nothing you can do that will relieve the rush in the spring like having some ground ready from the fall previous.

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We cannot help commenting on the poor results many growers are getting with their "Baby Beet Pullers." In many fields from one to two tons of beets per acre have been left. Some growers do good work with these but there are so many who do not that we have about concluded that there is something wrong with the machine itself. Unless manufacturers can make these machines so they will do better work in the hands of the average man, some other machine that has proven its success should be used.

News From Factory and Field

LONGMONT FACTORY

Harvest has been going along splendidly and while the number of men available is not as great as might be, the growers have planned their work so they are getting their crop out about as rapidly as they ever did. The good weather has helped much in this, of course.

Quite a number of growers have finished their harvest and are very much pleased with their crop, the almost universal statement being: "They are better than I expected." We have heard of several small patches running 27 to 30 tons per acre, and 17 to 19 tons per acre is a common statement.

We have experienced about the usual number of instances of hired men shoveling off dirt at the piles. Of course, the temptation is probably greater at ½ cent per pound than in past years. Perhaps they are not aware that the government tax on Sugar company profits is about 75c out of each $1.00 and that the amount they beat the Sugar company is only a small proportion as compared to the amount the government is beaten out of. The Sugar company can probably stand its small proportion, but the government needs all the money it can get.

---N. R. McCreery, Agricultural Superintendent.

BRIGHTON FACTORY

The weather conditions, up to this time, have been ideal for the harvesting of beets and most of the growers have taken advantage of this and are making good progress, in spite of the labor shortage. The receiving of beets, so far, has been most pleasant, and if the growers will continue to co-operate with us we will certainly do everything possible to avoid delays at the dumps and to make the beet harvest as easy as possible to everyone.

Undoubtedly you have all read Mr. Mendelson's article

on 'The Receiving of Beets," in the last issue of this booklet. If you have not, I wish you would read it carefully, as it is based entirely on facts and I am sure you will agree with what he says.

At this time of the year we always have the question of tare with us, although, up to date, we have had very little complaint as the beets have been coming in very clean and consequently have a low tare, but we are due for a storm almost any time and then the tare will go up. I want to remind you of the clause in your contract which gives you the right to employ check weighers and tare men. Of our twenty-four stations we have only one station taking advantage of this clause. We would like very much to have more of this done, for you would then know what our instructions are to these men and if they are not following these instructions we want to know it. Employing as many men as we do at our various receiving stations, we cannot always get the right kind of men and there are bound to be some arguments come up, and I want to say right here, that our employees are instructed not to argue with the growers but to refer them to the fieldman in charge of the district or to the Agricultural Superintendent. So, if you have any grievances take them up with your fieldman or with this office and I am sure they can be adjusted in a manner satisfactory to all. We would like it very much if you growers would visit our tare houses more frequently, especially if you think your tare is too high, and see how the tare is taken. They are open for your inspection at any time, and I am sure you will meet with courteous treatment from our men.

Your labor is supposed to cover all beets that are topped and left in the field over night. See that they do this. By so doing you will avoid being turned down at the dump on account of frozen beets.

—C. F. Johnson, Agricultural Superintendent.

LOVELAND FACTORY

Notwithstanding the nervous condition over a possible labor shortage in harvesting beets, our growers all seem to be making excellent headway. We have furnished a large number of teamsters, as well as field help, and our labor organization has, we feel, been a great help to the community, having shipped in people who, though not willing to work at the factory, immediately found other work on threshing machines, haying and other work.

The weather has been ideal for harvesting, and notwithstanding the fact that we were a little late in starting, I think we are as far ahead with the harvest as we have been any other year, at this date. The scarcity of help has been felt more in the factory than it has on the farms, and the slicing capacity has been cut down for that reason; so that it has been necessary to pile more beets than usual during the early part of the season. We are doing our level best to avoid delays, and the fact that each grower is getting the proportion in each car that he is entitled to, regardless of which loads are taken to the pile, makes it fair to everyone.

Most of our farmers this year have paid a little more attention to the quarters occupied by their beet help, so that after working hard all day they can be comfortable at night. The help appreciate this, and it is a settled fact that the man who has the best quarters gets the best help, and has the least trouble in keeping them.

The fact that the influenza outbreak closed the city schools has worked to the farmers' advantage, as most of the schoolboys who are inclined to work have been able to find profitable employment.

The fact that the price of pulp for the first 30 days is 80 cents per ton has not so far appealed to many beet growers, as very little pulp has been hauled up to date.

Our beets are running good in tonnage—several farmers report 23 tons per acre, and a great many report 20 tons. This from home-grown seed would indicate that it

will be unnecessary to go to Germany for any more seed.

We expect to finish threshing this year's crop of beet seed the coming week. It has been a difficult season to save the crop, as the showery weather made it impossible to either thresh or stack. The quality of the crop is fine, but a good deal of the seed shattered off on the ground and was lost on account of having to stand so long in the shock.

Notwithstanding labor shortage, etc., I am glad to say that we have got a great deal of fall plowing done in the Loveland district for next year's beet crop. We have found out it pays, and just get it done somehow.

In comparing the beet yields, this and other seasons, we cannot help but notice that the man who has a system of rotation, and follows it, always comes out on top, especially if he manures the land put to root crop each year. In other words, it does not pay to run to extremes in any crop. ---H. Scilley, Agricultural Superintendent.

GREELEY FACTORY

In looking over our delivery records, I find that the farmers have delivered thirty-three per cent of the total tonnage of beets raised this year for Greeley factory, as against thirty-three per cent of the crop of a year ago on this date. We are receiving about 3000 tons daily; and, barring storms, our crop will be practically all taken care of in fifteen or twenty days, or on about the 10th of November. This will make a very short harvesting season because of our piling beets early in the season, and receiving beets early in the morning and late at night, which enables farmers to deliver their beets quicker and with less trouble than any other tonnage raised on the farm.

But, this is not what I was going to say. I was going to say that by reason of late planting this year and a very dry spring and the trouble with worms, and our beets being green, we advised the farmers to irrigate their beets late in the season, yes, as late as the 20th of September, and a great many farmers can readily see the benefit of

late irrigation. All farmers who irrigated as late as September 10th to 20th have made one ton of beets per acre more than they otherwise would, and they have made more sugar and better purity. The land that has been irrigated late in the season will plow much easier and go into winter in better condition.

Now, I want to ask the farmers why they do not do more fall plowing when there is plenty of moisture in the soil and the crops are harvested and delivered and the teams are in good condition for work. When by fall plowing you will, as a rule, raise from one to four tons of beets per acre more than you will with spring plowed land, and raise your crop much easier and cheaper by reason of your crop being planted early and then you will keep ahead of the weeds and other foreign matter. Where land has sufficient moisture and is fall plowed it serves in a marked degree as a summer fallow, as it gets a great deal of rest by turning the land over and breaking the hardness of the soil as in plowing. The land will freeze and thaw and nature will pulverize and pack the land so that it will retain moisture in sufficient quantities that you can grow crops the following year with from one to two irrigations less than with spring plowed land.

Let's all do it. It is no experiment. These facts are as old as the moral law.

Farmers, let's spend a few minutes in discussing frozen beets. I just mention this in passing by as it is thundering and raining at the present time; and, as a rule, it generally freezes after a storm at this time of year. If it freezes hard enough it will freeze our beets and when beets are frozen it is wrong to store them in large piles at our dumps, as they will heat and spoil and soon be unfit for the manufacture of sugar. Knowing this to be a fact it will be willful and malicious wasting on our part to receive frozen beets and attempt to store them at our dumps. Especially is this true with the early frosts.

Now, farmers, let's try to keep our beets that are out

on top of the ground from freezing by covering them up with tops. Should you get your beets frozen do not bring them to the dump when there are no cars, for as you know, we cannot pile frozen beets until very late in the season, as it would be wantonly wasteful to pile frozen beets early in the season. Keep track of the cars at your dump, and when there are cars, deliver frozen beets; when there are no cars at your station, deliver your unfrozen beets, and we will put them in piles. By following out this plan you will be delayed but very little in your harvest. Let's try to work to this end.

But, in the meantime, let's make it so hot for the beets that they can't freeze, as they will all be harvested and delivered and in large piles where they will not freeze.

There is one thing I want to remind myself of every day and that is to remind others that it is good judgment and good business for myself and for yourself and for others to not waste one single beet this year around the dumps, scalehouses, tarehouses, wagon sheds, railroad sheds or along the highway leading to or from any dump, shed or scalehouse, or to leave beets in flumes at the factory when changing from one flume to the other. I have said that I will not permit, if I can possibly avoid it, to allow any beets to be wasted around any of our dumps, shed scales, highways, or any other place. I have instructed all of our crews to this effect.

Farmers, Dumpmen and Unloaders: just listen for one moment. Your company pays one-half cent per pound for sugar beets, and if you pass up ten pounds of sugar beets you pass up one pound of sugar, which is one-half of your rations for one month. Suppose you continue to do this, and, worse, leave a goodly amount of beets scattered all over the field and load your wagon over the capacity so they will fall off and are scattered along the highway from your field to the dump or factory. These beets will be run over with horses, wagons and automobiles and will be eaten up by all kinds of stock that comes along the highway. I call this wilfully wasting; yes,

wasting something that cannot be recovered. When you waste a hundred pounds of sugar beets you rob the coal miner of his share of the benefits of the industry, you rob the people who make the bags, likewise the men who furnish the chemicals. You rob the rock men and you rob the railroad men. Last, but not least, you rob the factory boys of their share which they have been looking for for some time, and when it is all over you have deprived the labor of his share of the profits and you have wasted ten pounds of sugar worth $1.00 which will pay interest on $14.00 for one year.

It is due to our savings that we are able to feed the allied nations. Let's save more and have more!

---H. Timothy, Agricultural Superintendent.

STERLING FACTORY

The harvesting of beets is now in full blast, ten days after opening the first receiving station, we had 50,000 tons of beets received. We are now receiving 8000 tons or better per day. At this rate it will soon be over.

Now is the time for the renter to do a little calculating on next year's plans. Perhaps he can manage to crown a piece of alfalfa, or plow another patch of stubble, anything toward the preparation of part of his beet land for another year will be to his advantage next spring. Make your plans just the same as though spring were here now.

In traveling over the district I notice a great many beets are left in some fields by the puller. Whenever you see this you can rest assured there will be quite a few with the lower end of the beet, which you don't see.

Now the country needs sugar, and if you will go over an acre and procure all the beets you will at least be able to see where some of your losses are, and where the country would be ahead if you had saved them.

---Chas. E. Evans, Agricultural Superintendent.

NEBRASKA DISTRICT

The Nebraska District is enjoying a splendid harvest season for beets and potatoes. While potatoes through-

out the District were as good as a year ago, the beets are exceeding the estimates of the optimists. Weather conditions were so favorable that beets continued to grow through the month of October which is something unusual for this part of the country.

All three factories in the District can be said to have gotten started rather well considering the handicap of shortage of labor. This start was due principally to the energy and stick-to-itiveness of the men in charge of the Nebraska District. It was an inspiring sight to men who were doing two men's work to see Assistant General Manager Simmons, Assistant General Superintendent Hooper, together with C. S. Campbell, V. I. Daniels, A. M. Gregg, D. L. Parker and several others, put on overalls and start work on the rock pile. Not only that, but many other instances of like nature at each factory have put them on a sound running basis.

On account of the farmers not siloing quite as many beets as when the silo clause was in effect, the receiving stations have been handling more beets daily this year than ever before and this has been done with much less friction between farmer and factory employee. The manner of handling frozen beets when understood by the grower is quite satisfactory. It might be well to outline here Mr. Heldt's method of handling frozen beets and prorating car space. Each grower has been allotted space in each empty car set at his loading station, based upon the percent his estimated tonnage is of the entire estimated tonnage at that station, using fifty-ton cars on the Burlington and forty-ton cars on the Union Pacific. If a man has a limit of three tons per car he will be entitled to deliver three tons of frozen beets per empty car set. Each grower is notified as to his limit per car.

The receiving station at the Scottsbluff factory is the largest in the entire District, averaging about 450 loads per day during the month of October with 492 loads as the largest number for any one day.

Feeding operations throughout the valley are starting

slowly but surely as all the steers are in very good condition owing to the abundance of grass on the various ranges from which they were received. Promises along the feeding line seem to be for good gains right from the start as no starved vacancies have to be filled before a gain can be made. There is going to be an ample supply of hay for all needs, although some are holding hay for spring prices which may prove as disappointing as they did last year.

We must also mention the influenza as it is taking its toll here as well as other places, but even here it seems to be much worse in some places than in others. A change of weather would be very welcome if only snow would come with it to rid the atmosphere of dust and disease germs.

---W. A. Nelson, Agricultural Clerk, Scottsbluff, Neb.

MISSOULA FACTORY

Have been out on our farms all week trying to hold up organizations after ten days of wet weather, and while we only have a very small acreage here we have more grief trying to harvest it than you have with 20,000 acres in Colorado.

We started our campaign at Missoula under favorable conditions and with a good organization, on September 26. On September 29 we had a heavy rainfall over the entire district which was followed almost every day until October 12 by showers and cloudy weather, keeping our fields wet and soft and tearing up the wagon roads. As our company is growing almost 600 acres and are depending on hiring many teams to move the crop, this proved a disaster, as no terms we could offer would induce those haulers to stay with us. The weather has been good this past week and we now have a fair organization again, and are making good progress with our crop harvest.

Our crop as a whole is fair, while we have a good many individual crops which look better than beets I saw pass-

ing through some districts in Colorado several weeks ago. This territory seems to be quite free from hail, and as we had no leafspot nor were troubled with web worms, our foliage is exceedingly heavy.

We have had no frost of any consequence and tops are standing up nicely and causing little trouble in lifting, and very few of the farmers are using coulters on pullers.

A few of our growers have finished deliveries and report 15 and 16 tons per acre, and we have some individual fields in the Bitterroot valley that will turn off about 20 tons per acre.

Sugar content seems quite satisfactory and a little higher than Colorado this season.

We are peculiarly situated here as farmers have done no intensive farming and the work does not appeal to them. A cultivator is for killing weeds, so that there is no necessity to cultivate clean land, and this is a district where weeds are very prolific, so we have in sight an immense lot of educational work to do.

Our good crop this season has caused the farmers to take more interest in sugar beets than at any time since we came here and we expect a fair acreage for the coming season. ---R. M. Barr, Agricultural Superintendent.

BILLINGS FACTORY

?

Influenza

Harvest

To Hell With the Kaiser

Line Busy

See You Later

---C. S. Milhiser, Agricultural Superintendent

Balanced Farming

H. Mendelson

A SURVEY of the irrigated farms in the beet district of Northern Colorado made by our fieldmen during the summer of 1917 showed that there was:

One third of the irrigated and cropped land in alfalfa; one-third in grains, such as wheat, oats, barley or rye, and one-third in intertilled crops, such as beets, potatoes, beans, corn and truck.

Of course individual districts and more so individual farms differ from this somewhat.

For instance, sections where more than 50% of the cropped and irrigated land was in grain, only one-fourth of the land was in alfalfa, and one-fifth in intertilled crops.

On the other hand, at sections where more than 20% of the land was in potatoes, districts enjoying the advantages of an easily tilled sandy loam, we have about one-half of the land in intertilled crops, and only about one-fifth in grain, but still one-third in alfalfa.

This balance between grain, alfalfa and intertilled crop has established itself automatically as a farming plan fitting our farm conditions as made by climate, water supply, labor requirements and markets.

The Sugar company has adopted this scheme for our own farming operations.

The ups and downs of prices and crop yields modify this scheme to some extent. For instance, in districts with light soil many an acre has been planted to beans, which otherwise might have been in beets or in grain as nurse crop for alfalfa.

The bean crop is not what it was hoped to be. Many acres in the favored grain districts around Longmont and Loveland bore this year the third or second wheat crop in succession. Some of this land was in beets in 1916 and has not been plowed since.

Some of these wheat crops did not produce as much as it was hoped.

But whatever the deviation from the general scheme, very few sensible farmers on our irrigated farms, will put all their land in grain, or beets, or potatoes, or any other one crop.

In fact, on some of our best paying farms with the highest yields per acre, the same acreage of at least three crops fitted for the district is planted every year regardless of price.

The same philosophy is followed by our most successful stock feeders, who feed the same number of animals the same old way or a little better every year, regardless of prices obtained or paid.

Our Northern Colorado district, as a whole, has a diversity of crops and a rotation scheme as good as any devised by a college professor.

Individual farms here and there are somewhat below this high standard, sometimes for good reasons and sometimes for no reasons, although very few ever admit it.

The writer knows one farmer, a very earnest advocate of rotation, and very seriously concerned about maintaining the fertility of his neighbor's lands, who talks on these subjects every time he has a chance. This farmer does raise alfalfa, beets, grain and some corn. However, on this farm no alfalfa sod has been broken nor any land reseeded to alfalfa for five years. The beets are on the same ground every year, the grain also. Regardless of which grain is planted, oats, both tame and wild, and wheat mature in the same field.

Thus are we all sometimes more intense in our preaching than our practising.

How does our Northern Colorado system compare with other localities?

A. 90% of the Land in Grain.

The state of North Dakota has the largest wheat acreage of any state in the Union, seven million acres being harvested in 1917, with an average yield of eight bushels per acre.

The ten-year average yield of wheat in the United States from 1908-1917, was 14.7 bushels. That of North Dakota was 11.0 bushels. There were only a few states lower than that, namely, North and South Carolina and Georgia.

According to the crop reports of the Department of Agriculture at Washington, North Dakota raised in 1917 the following acreages of various crops:

Wheat	7000000	acres
Rye	1040000	acres
Oats	2575000	acres
Barley	1825000	acres
Flax	965000	acres
Total grain	13405000	acres
Corn	590000	acres
Potatoes	90000	acres
Total intertilled	680000	acres
Hay	550000	acres
Total acreage in staple crops	14635000	acres

There was, therefore, 91.5% of the cropped land in grain, 4.6% in intertilled crops and 3.9% in hay.

Not much diversity of crops here and not much chance for rotation except summer-fallow, which is by no means the universal practice.

This system is, to a large extent, due to the severe and erratic climate with a short growing season. Before the war a great deal of preaching was done in this state as to the imperative needs of another crop system, containing more forage and live stock. The high grain prices obtaining at present of course will induce many farmers to keep up the old practice.

The yields obtained in the last ten years for the various crops in North Dakota are reported by the Department of Agriculture as follows:

YIELDS PER ACRE IN BUSHELS

	Wheat	Oats	Barley	Rye	Flax	Corn	Potatoes
1908	11.6	23.4	19.5	18.0	9.0	23.8	85
1909	13.7	32.0	21.0	18.9	9.3	31.0	110
1910	5.0	7.0	5.5	8.5	3.6	14.0	41
1911	8.0	23.5	19.5	16.6	7.6	25.0	120
1912	18.0	41.4	29.9	18.0	9.7	26.7	128
1913	10.5	25.7	20.0	14.4	7.2	28.8	85
1914	11.2	28.0	19.5	17.1	8.3	28.0	109
1915	18.2	40.0	32.0	15.0	9.9	14.0	90
1916	5.5	21.5	15.5	13.3	10.3	26.5	93
1917	8.0	15.0	12.5	9.5	3.9	9.0	43
Average	11.0	25.8	19.5	14.9	7.9	22.7	90
Average U. S.	14.7	31.2	25.1	16.1	8.2	26.0	95.9

North Dakota is the state where the Non-Partisan league originated. Looking over these yields, one cannot help but wonder how far these low yields are responsible for the intense political radicalism.

It is hard to see how the most economically managed state owned elevator can make an eight-bushel wheat crop a paying proposition. And there were, in the last ten years, two crops averaging five bushels and two crops averaging eight bushels in North Dakota.

Old timers will remember what the political consequences were in 1893 when Kansas had an eight-bushel wheat yield combined with 45c per bushel.

B. 90% of the Land in Intertilled Crops.

Next to Texas, Georgia has the largest acreage in cotton---about five billion acres in 1917. The culture of cotton in some ways resembles that of the sugar beet. Cotton is blocked and thinned and cultivated and can be classed as an intertilled crop.

Georgia, in 1917, raised the following acreages:

Wheat	244000 acres
Rye	15000 acres
Oats	650000 acres
Total grain	909000 acres
Corn	4500000 acres
Potatoes	19000 acres
Sweet Potatoes	125000 acres
Cotton	5028000 acres
Total intertilled	9672000 acres

Hay	535000 acres
Total acreage in staple crops	11116000 acres

There was, therefore, 8.0% of the cropped land in grain, 87.2% in intertilled crops and 4.8% in hay.

In the past a considerable part of the alfalfa meal shipped out of the Big Horn Basin, Wyoming, and Colorado, went to Omaha, was there mixed with Colorado molasses, oats and corn and finally went to Georgia as horse feed.

The ten-year average yield of wheat in Georgia is 10.6 bushels, of oats 19.4 bushels, of corn 14.7 bushels, of sweet potatoes 86 bushels.

The average yield of cotton lint is 192 lbs. per acre, with an average value of 13.8c per pound, or about $27 per acre.

Before the war and particularly in 1914 when cotton prices were very low, state and national authorities were preaching in the cotton states the gospel of diversity of crops and crop rotations, particularly that of more leguminous forage---in this case, cow peas.

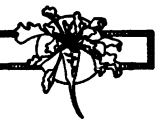
The reconstruction of cotton state agriculture on more rational lines is considered one of our most important national problems.

C. 55% of the Land in Intertilled Crops.

The state of Iowa had in 1917 the largest acreage of corn, namely, 11100000 acres.

The following acreages were raised in 1917:

Wheat	420000 acres
Rye	50000 acres
Oats	5250000 acres
Barley	300000 acres
Flax	12000 acres
Total grain	6032000 acres
Corn	11100000 acres
Potatoes	138000 acres
Total intertilled	11238000 acres
Hay	3160000 acres
Total acreage in staple crop	20430000 acres



There was 30% of the land in grain, 55% in intertilled crops and 15% in hay.

The ten-year average yield of wheat in Iowa is 18.7 bushels, of oats 35, of barley 27.8, of corn 34.9, and of potatoes 80 bushels.

This state keeps more live stock per 100 acres than most other states and therefore should have a large amount of manure.

Nevertheless, the essence of all the agricultural preaching done in this most fertile state is regular rotation of clover, grain and corn, together with the application of stable manure and phosphates.

This system, according to the investigations of the Agricultural college, would almost double the yields obtained.

The yields in the states of North Dakota, Georgia and Iowa do not compare favorable with those obtained in our Northern Colorado irrigated sections.

Soil, climate and irrigation, of course, are in our favor.

Nevertheless, competent men in all three states recommend a system nearly approaching ours, the essence of which is leguminous forage, grain and intertilled crops in proper proportion.

Our possibilities in the line of diversification and rotation are almost ideal.

Individual farms frequently are not up to the standard. But on the whole, almost every acre of irrigated land at some time has been in alfalfa or beets, potatoes, beans, corn or grain.

Our high grain yields are obtained where the land has been in alfalfa and beets or potatoes before.

Our high beet and potato yields are obtained where the land has been in alfalfa and other crops in the past. Temporarly high prices of one crop or another should not make us forget that the high productivity of our Northern Colorado farms, probably one of the best producing

districts in the United States, is at least partly due to a trinity of crops---leguminous forage, grain and intertilled.

None of these should over-balance the other for any length of time.

At present land prices it takes more than one or two years to pay for the farm; and farming should be conducted on a plan that is good for more than a year.

Silage Worth $7 per Ton

Silage value is often estimated as approximately one-third the value of alfalfa hay, according to H. Umberger, county agent leader for Kansas.

"Alfalfa has been selling as high as $27 to $30 per ton the past year," said Mr. Umberger, "and at present is bringing about $21 a ton delivered at Kansas City. On this basis silage is worth $7 per ton. Some farmers may look upon the silo as an impractical business proposition this year on account of the increased cost of construction and the difficulty of securing additional labor for filling the silo. Many farmers in the state are filling their silos with little additional help, and in many localities where the farms average about 160 acres and the usual force of farm help is relatively small, the farmers club together for the exchange of help at silo-filling time. Either of these plans reduces the cost materially.

"It is not necessary to fill the silo in two days. More time can be taken and a smaller crew used, provided there is not a greatly increased over-head charge for the use of expensive silo-filling machinery. Silage valued at $7 a ton is worth more than double what it was worth when the cost of silos was 25 to 50 per cent below the present cost."---From "Western Farm Life" August 1, 1918.

The Great Western Sugar Co. Ranch

H. C. Giese

E are giving you in this issue three views of Dairy Farm and Herd, situated one-half way between Fort Morgan and Brush, Colorado, on the Lincoln Highway, owned by The Great Western Sugar company.

One herd is headed by "Avoca Lodge Johahna No. 215010 H F H B," which bull was purchased from Donley & Simpson at Mount Morrison, Colorado, registered in the Holstein-Friesian Association of Brattleboro, Vermont.

We are also in possession of the following cows:

"Zeldenrust Snowflake Pontiac No. 278201 H F H B."
"Gwendolyn Las No. 228742 H F H B."
"Jenny Pledge Pauline 2nd No. 287944 H F H B."
"Nina Albina Korndyke No. 294900 H F H B."
"Lily Never Again No. 223162 H F H B."
"Josephine Korndyke Queen 2nd No. 222841 H F H B."
"Avoca Lodge Pontiac Jewel No. 313889 H F H B."
"Avoca Lodge Mamie No. 300814 H F H B."

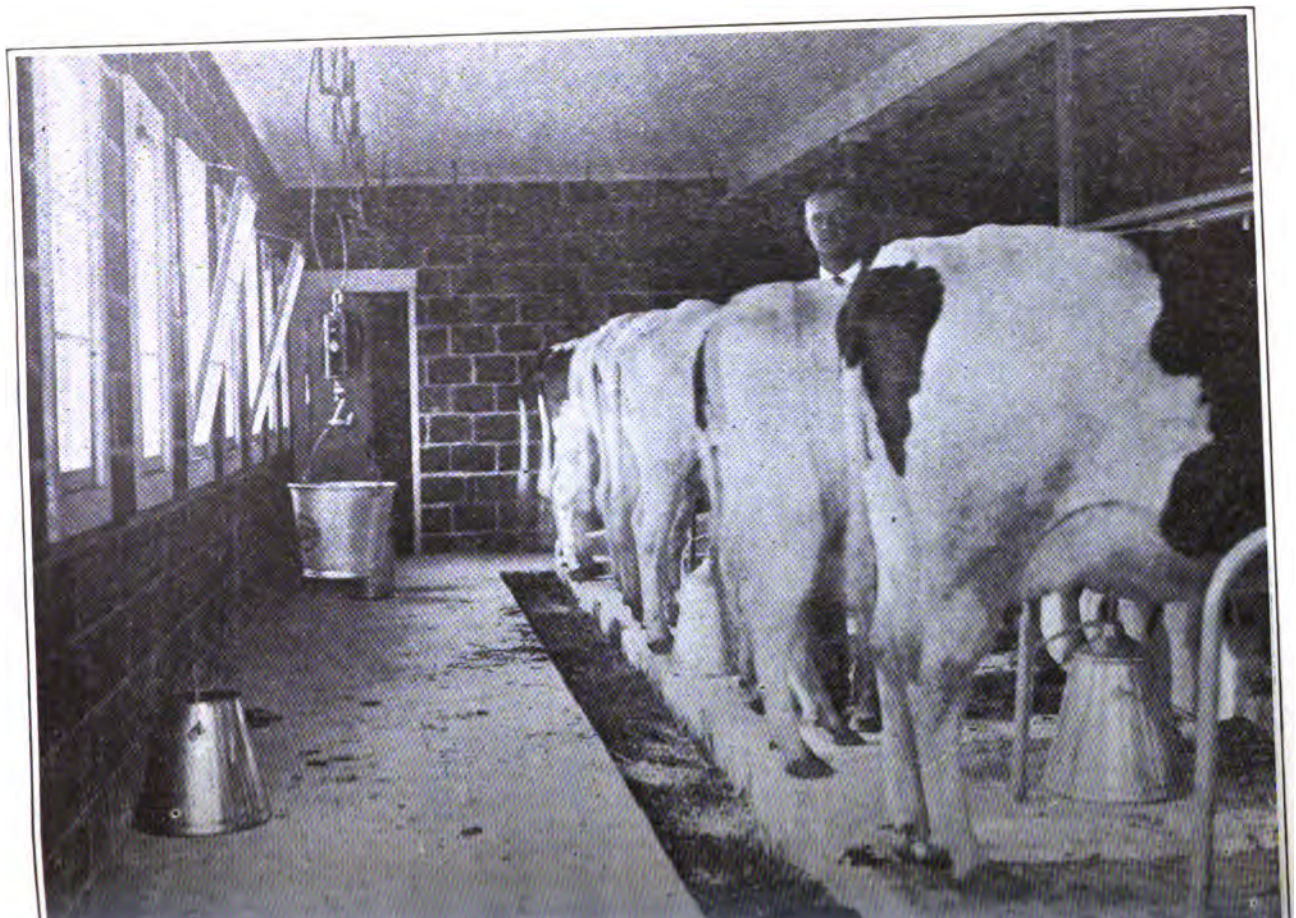
We also have three full-blooded Holstein calves. Our object in establishing this dairy herd on one of our farms is to help stimulate the keeping of live stock on the farm in Northern Colorado and to assist those interested in dairying. After we build up a strong herd we wish to be in a position to help the farmers that desire to acquire pure bred stock from a herd that is fully acclimated, and reared in their own community and for that reason stockmen will be in a position to become fully acquainted with our farm and stock. We expect to keep careful records on each individual, and from time to time we are going to give the

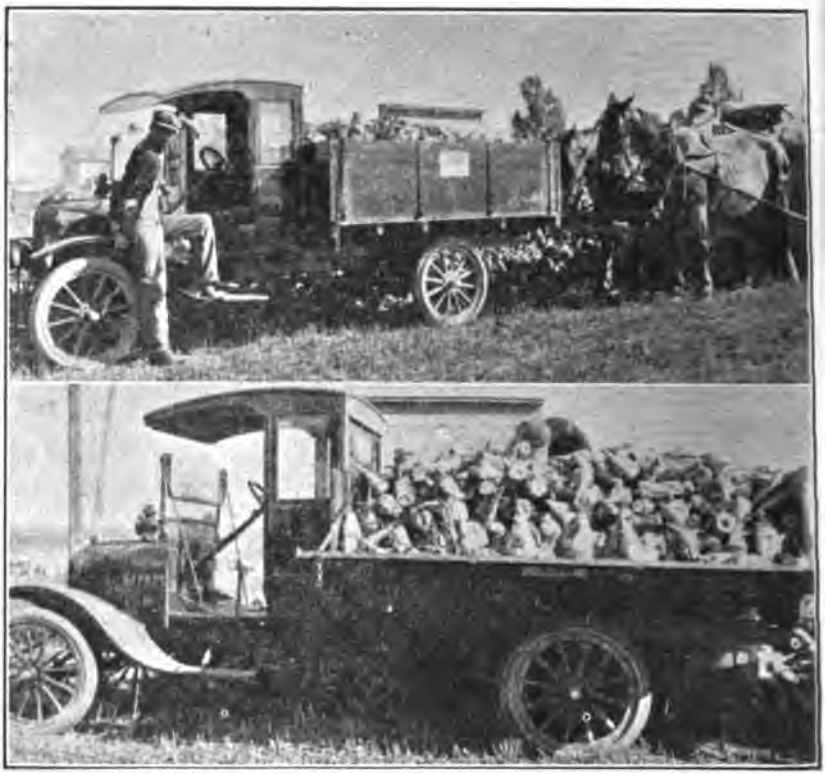
public the results that have been obtained from these individuals and from that information give our farmers the benefit of our experience. That the public is interested in our dairy undertakings was demonstrated one day when 60 automobiles visited this ranch and gave it the once-over.

The dairy herd itself was acquired at a price exceeding $5000 and the herd, dairy barn, sheds and hog house involved an expenditure of $10,000. We consider ourselves fortunate in being able to bring as fine a herd of cows as this to Morgan county. We cordially invite the public to visit this ranch at their convenience. The farm is under the supervision of Mr. John Orr and Mr. James Carnahan. The latter expects to move out on the farm within the next several weeks. Mr. Carnahan is an experienced dairyman from the east, and will be glad to answer any questions relative to the herd and the dairy installation, and anything you may be interested in in connection therewith.

We are selling the cream and feeding the skimmed milk to our herd of hogs. This farm contains 160 acres. We have a silo on the farm and grow our own corn for corn silage. We are following a definite system of crop rotation and the results obtained with this definite idea in mind will be of interest to our farmers in the community. Eventually we expect to keep nothing but pure-bred stock on this farm. Horses, mares, cows, hogs, as well as chickens, and in this way hope to assist in bringing better live stock and greater interest in better farming and breeding of live stock on our farms. The beet sugar industry, farming and live stock raising go hand in hand.

It don't take any more care to grow a high-classed animal and grow sugar beets with a maximum yield than it does a scrub animal and a minimum yield. Greater profits with the same amount of energy. ENERGY is the word of the day.—Morgan Co. Farm Bulletin, June 15, 1918.

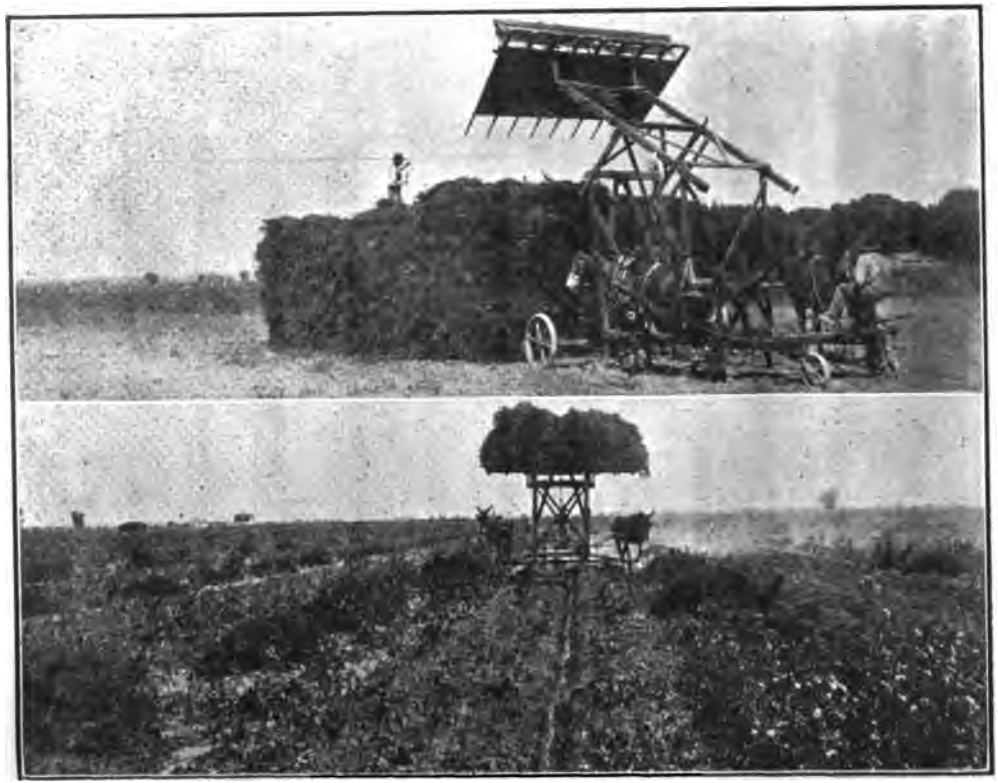




T. A. Matthews Hauls 18 Tons Per Day a Distance of 2½ Miles at a Cost of $2.00 Per Day for Operation of Truck.

Threshing Beet Seed at Loveland.

Geo. Freoff Has a Crop That is Averaging 19 to 20 Tons.



Stacking Beet Seed at Scottsbluff.

Cleaning up the Beet Crop

J. F. Jarrell

ALL good farmers see to it that when their beet crop is harvested, practically every beet is removed from the ground and put over the dump. All farmers, not being good farmers, one sees as he goes about the country, many beet fields from which all the beets were not taken. It reminds one of a poorly shaven face to look across a beet field after harvest and see here and there numerous beets standing. One can hardly realize the loss of cash a farmer bears when his work is handled in such a slipshod manner unless he has some light upon the subject.

Herewith is shown a photograph of 17 beets taken from 100 feet of row in a northern Colorado beet field. These

beets weigh, cleaned, 23 pounds, an average of 1.35 pounds per beet, or 0.23 pounds per foot of row. Assuming that the rows were 20 inches apart, the loss to the farmer would be 3.003 tons of beets per acre. At the present price that would be $30.03 cash loss. The farmer would probably cuss the labor a little and turn the cows in to graze the tops off so it would not look so bad.

Below is given a table which shows the loss of cash per acre when varying numbers of beets are left in the field, assuming that the average weight of the beets is 1.25 pounds:

Beets left per acre	Weight of Beets left per acre	Cash loss per acre
100	125 lbs.	$ 0.62
150	187 lbs.	0.93
200	250 lbs.	1.25
500	625 lbs.	3.13
1000	1250 lbs.	6.25
2000	2500 lbs.	12.50
4000	5000 lbs.	25.00
5000	6250 lbs.	31.25

A farmer cannot afford to let even one beet per 100 feet of row stay in the field, for that means not only a net loss to him of $1.63 per acre which will pay for his next year's beet seed for an equal acreage, but also sets a bad example for his neighbor.

The writer saw another field which was poorly harvested and measured off an acre and counted the beets, finding that 1660 beets were left, representing a net loss of $10.37 per acre, assuming that the beets averaged 1.25 lbs. each. The reason I say net loss is that the farmer has been to all expense necessary to grow and harvest the beets which were left except the hauling which, of course, could be legitimately charged if it required extra trips to put the missed beets over the dump.

By saving the beets we save money and these days we need the money. It also follows that when we save beets we save sugar and we likewise need the sugar.

Organization and the Farm Labor Problem

H. H. Griffin

WHERE and how to secure the necessary labor for farming operations is a question that every farmer is asking at the present time. The farmer, more than anyone else, has at all times, relied upon a very slipshod method of securing his help. This method has been sufficient when help was plentiful, but is not suitable at a time like the present.

There has been no system by which compensation could be fixed, nor has there been any method devised by which to meet any unusual demand for help. If good fortune happened to supply the help just at the time needed, all well and good, but if the help did not voluntarily appear there was no concerted movement by which relief could be secured. Times of stress like the present call our attention to the weak points and point to the necessity for methods different from those that have at other times been sufficient.

One of these is organization. The government and other organizations often try to determine the need for farm labor in certain areas—the County Agent, to whom the government entrusts this work, can give but a vague report, for there is no medium through which he can obtain the necessary information. He has to investigate the matter in a sort of a general way and make a rough guess of probable requirements.

What is true in regard to securing numbers is also true in regard to compensation. This feature of the farm labor situation is generally met as follows: "Well, what will you pay?" "Well, I'll pay the going wage, what do you want?" "Oh, all I want is what others are paying." So they parley, and the farmer makes an offer; the laborer,

for fear he is not getting just as much as some other, tries to raise it, or possibly he accepts it, and in a few days finds that some one else is getting more than he, and he at once strikes for higher wages. A good illustration of this is shown in the case of a farmer near Fort Collins, recently. He hired a man to work through the harvesting period, with the understanding that "the usual rate of wages" would be paid. After the man had been at work for about a week the farmer thought it would be well to have an understanding as to pay, so he accosted the laborer in regard to it, whereupon he demanded $200.00 per month, and board. The farmer said he could not and would not pay any such sum, and the result was the laborer quit. The chances are that if some business system had been employed at the outset the same man could have been hired for very much less, and, if he had not, the farmer would have been able to have gotten help at the start to which there was a much greater degree of fixation. In most all lines of industry there is a somewhat established wage by which anyone contemplating work expects to be paid. The employers do not bid against one another as do the farmers at the present time.

It is possible, through organization, for the needs of any community to be centralized and handled through an agency. It is through organized effort on the part of the Sugar company that great numbers of people are secured for beet work, and organization on the part of the farmer might secure analygous results for them in securing help for other lines of farm work. The value of organization does not lie wholly in the labor problem. There are many other avenues that may be handled with profit, to say nothing of the educational and social features. Most farmers in ordinary times cannot see wherein an organization may be of profit, and it requires just such times as these to emphasize the fact that organization is essential. The farmer should come to know that it is not necessary that dollars and cents in considerable numbers should at all times pour in from the organization to justify his taking part in one. Organizations are not accomplished in

a day, in any line of endeavor, much less so in those engaged in rural pursuits where the members are so much scattered.

Organization is considered essential in this present day, in all lines of activity. Do not be a slacker by failing to take part in those organizations that are established with the intention of benefitting the farming game. Become an active agent in one and let your influence be brought to bear in making it an efficient agency in bettering the farming community and an institution that will be a credit to the world at large.

Grinding Feed

The dairy cow is a hard working animal and it pays to prepare her ration well if she is to do her best work. The feeding of whole grain is uneconomical; not only does it waste a large amount of it but the cow will not produce milk to her full capacity.

The Michigan Experiment Station found that when cows were fed whole corn, about 23 per cent of the kernels passed through whole and undigested, indicating that this much of the feed had been entirely wasted. When cows were fed whole oats over 12 per cent of them passed through undigested and when fed corn and whole oats, over 26 per cent of these feeds were not masticated. It is plain that the feeding of whole grain means a heavy loss.

It may be added that grinding feed for horses, especially those having impaired teeth which comes with advanced years, is profitable. The Illinois Experiment Station holds that ground grain is slightly more digestible than whole grain and it is usually considered by the best authorities that a 10 per cent saving in grain can be effected by grinding.---From "Hoard's Dairyman" Oct. 11, 1918.

Representative Live Stock Sales at Denver Yards for October, 1918

Reported by "Record Stockman"

FEEDERS

	8.00 8.45	8.50 8.95	9.00 9.45	9.45 9.95	10.00 10.45	10.50 10.95	11.00 11.45	11.50 11.95	12.00 12.45
801 to 900 lbs.									
Oct. 1-15	43	7	203	71	512	112	566	.....	15
Oct. 16-26	19	166	179	67	110	132	33	.....	.....
901 to 1000 lbs.									
Oct. 1-15	40	13	10	69	143	199	366	68	153
Oct. 16-25	6	1	22	140	.....	234	110	.....	.....
1001 to 1100 lbs.									
Oct. 1-15	.....	49	1	5	67	50	.....	147	26
Oct. 16-25	10	1	78	.....	.....	50	61	.....	.....

LAMBS

	11.50 11.95	12.00 12.45	12.50 12.95	13.00 13.45	13.50 13.95	14.00 14.45	14.50 14.95	15.00 15.45	15.50 15.95
50 to 59 lbs.									
Oct. 1-15	278	584	1011	7308	.....	817	.....	.....	.....
Oct. 16-25	.....	.....	.....	517	.....	.....	1297	.....	.....
60 to 69 lbs.									
Oct. 1-15	.....	1789	772	1692	.....	2231	2131	1049	.....
Oct. 16-25	.....	.....	.....	262	267	.....	512	.....	.....

LAMBS "F. P. R."

	11.50 11.95	12.00 12.45	12.50 12.95	13.00 13.45	13.50 13.95	14.00 14.45	14.50 14.95	15.00 15.45	15.50 15.95
50 to 59 lbs.									
Oct. 1-15	.....	517	.....	9955	5036	.....	578	.....	.....
Oct. 16-25	.....	.....	354	1771	966	522	.....	.....	.....
60 to 69 lbs.									
Oct. 1-15	3114	4212	.....	409	.....	598	4988	.....	.....
Oct. 16-25	.....	.....	.....	2703	.....	1080	1491	285	.....

EWES

	5.00 5.45	5.50 5.95	6.00 6.45	6.50 6.95	7.00 7.45	7.50 7.95	8.00 8.45	8.50 8.95	9.00 9.45
80 to 89 lbs.									
Oct. 1-15	256	714	1226	.....	538	.....	773	.....	152
Oct. 16-25	5	.....	.....	300	985	.....	.....	.....	.....
90 to 99 lbs.									
Oct. 1-15	.....	.....	391	76	20	.....	398	.....	.....
Oct. 16-25	.....	.....	.....	1000	.....	770	.....	133	.....
100 lbs. and up.									
Oct. 1-15	10	.....	.....	127	.....	.....	728	507	321
Oct. 16-25	.....	.....	.....	.....	56	.....	105	.....	.....

Oct. 1-15—122 @ 9.50-9.95.

Why the Sugar Beet Grower Should Fall Plow

J. A. Brock

THE subject of this article is one which has a special timeliness at the present season, when farmers in the beet growing districts of the United States are planning their fall work. Mr. Brock gives a clear and practical presentation of the reasons why fall plowing produces better results and fits better into the scheme of farm operations than plowing in the spring.---Ed.)

Effects of Fall Plowing

The importance of fall plowing the land to be devoted to sugar beet culture is a matter that no farmer who would harvest the largest possible yield of beets can afford to overlook.

One of the major reasons why the land should be fall plowed is that by so doing the soil's ability to absorb and conserve moisture will be greatly increased. When it is remembered that in the physiology of sugar beet growth the chief function of water is that of a carrier of plant food, it is obvious that the presence of ample water in the soil throughout the period of the beets' growth is most vital and important.

Fall plowing is conducive to the absorption of water by the soil for several reasons. The breaking up of the soil immediately after harvest renders the land rough and causes many openings which extend directly to the lower soil strata to be formed. As a result of the rough condition of the soil surface, the flow of rain water is hindered and the openings in the soil make it possible for the water to gain access to the lower soil strata, where, if proper precautions are taken, it will be stored until the time when it is required by the growing beets.

Moisture Lost by Packing

Where land is not fall plowed it will be found that the late summer rains, together with the trampling during harvest, cause an almost solid layer of soil to be formed on the surface. The winter precipitation, being unable to gain ready access to the soil, will remain on the surface or will be evaporated. In addition to this, if the land has a tendency to slope the water will drain off the surface into the ditches.

Fall plowing increases the pore space in the loose plowed layer of soil, enabling it to absorb more water before percolation begins. King has observed, in May, a difference of 2.3 per cent of water in the top 3 feet of soil in favor of fall plowed land, as compared with adjoining land that had not been plowed. Thus, it will be noted that, as a result of the fall plowing in this instance, there was a gain of 110 tons of water per acre, or the equivalent of 1 inch of precipitation.

Not only is the fall plowing beneficial in that it renders the soil capable of water absorption, but it also plays an important part in rendering the soil capable of moisture conservation. Fall plowing permits the conservation of water in three ways:

1. Owing to the fact that fall plowing enables the farmer to prepare his seed bed earlier than is possible when spring plowing is practised, it is possible, if so desired and other conditions are favorable, to plant the beet seed early. The beets resulting from this planting naturally will have the benefit of much of the surface water that is lost through evaporation in the case of the late planted beets.

Permits Early Mulching

2. The possibility of forming a mulch blanket on the soil surface early in the spring also has a tendency to conserve the moisture the winter rain and snow has placed in the lower soil strata. In other words, if the land is not plowed until the spring the farmer cannot mulch the soil surface until the soil has become dried out to the full depth of the plowing, lest the plow turn up wet cheesy

chunks of soil, which in many instances cause the land to become practically incapable of crop production. During this period of waiting, owing to the unmulched condition of the soil, much of the surface water resulting from the spring rains is lost by evaporation. In addition to this, when the land is finally plowed there follows another period during which an additional amount of moisture is removed from the soil by evaporation. Thus, a double loss of water is brought about. On the other hand, the farmer who plows his land in the fall can conserve practically all of this moisture for the reason that he can start mulching the soil surface the moment the first two inches are sufficiently dry to permit working.

3. If the land is fall plowed all weeds, manure, stubble or straw that may remain after harvest will be plowed under and by the action of the bacteria in the soil will be decomposed and converted into humus, which in turn plays an important part in soil moisture conservation.

On the other hand, if the refuse is not plowed under until spring its decomposition and conversion into humus will not take place for some time. During this period the soil is prevented from settling properly and consequently dries out quickly. The writer has observed soils which dried out so rapidly that the decomposition of the organic matter plowed under in the spring did not take place all summer.

Better Results With Refuse

In contrast, he has observed fall plowed land that previous to the plowing was literally covered with straw and stubble, in which every particle of the refuse had totally decomposed long before spring. These facts lead to the conclusion that where a large amount of coarse refuse is to be plowed under the fall is the only time in which it may be done without the danger of rendering the soil non-productive as a result of drying out.

Fall plowing is also advisable for the reason that, as a result of the alternate freezing and thawing, together with the alternate wetting and drying of the land, the puddling effects of trampling, especially on stiff land, are obliter-

ated and the soil is given a loose and open texture. In addition to this a more compact seed bed may be made where fall plowing has been practised, for the reason that the complete decomposition of the organic matter plowed under permits the soil to settle properly, together with the fact that fall plowed land has had all winter in which to settle, whereas spring plowed land cannot possibly be fully or properly settled before the seed is planted. These are the reasons why beet seed planted in a seed bed prepared in soil that has been fall plowed always shows a better germination, and in consequence a better stand, than that planted in spring plowed soil.

Deeper Plowing Possible

Another important advantage fall plowing has over spring plowing is that in the former deeper plowing is possible. This is explained by the fact that any raw soil that may be turned up has all winter in which to become mellow as a result of the action of the elements.

The fact that fall plowing saves time is a matter of no small import to the farmer. In the first place, the plowing season is longer in the fall than in the spring. Second, the fall plowing comes at a time when the farmer is not so crowded by other work as is usually the case in the spring. Third, the early preparation of the seed bed possible where the land has been fall plowed enables the farmer to have this work completed long before the usual spring rush of work starts.

Attention is also called to the fact that as a result of the additional surface area exposed to the action of the rain and frost throughout the winter months, the weathering of the soil is increased. This, in turn, results in a considerable additional amount of plant food being made available.

Another important benefit of fall plowing is that it has a tendency to better the sanitary condition of the soil. In other words, the proper aeration of the soil throughout the winter months makes it possible for the oxygen of the air to act upon the toxic substances which have been deposited in the soil by the former crop, which are thus

rendered non-toxic. In addition to this, the proper aeration of the soil plays an important part in converting plant food into available form. Aeration is likewise essential to the growth and work of soil organisms, bacteria and fungi, all of which have an important bearing on the yield and quality of the crop.

Helps Control Insect Pests

Again, fall plowing has been found to be very effective in the control and destruction of insects, such as the chinch bug, cutworm, wire worm, white grub, etc., for the reason that, with few exceptions, neither the insects nor their eggs can withstand exposure to frost action. It also plays an important part in the control of weeds, for the reason that the late summer growth of weeds is destroyed by plowing under. In addition, where the land is fall plowed the spring weeds make their appearance early and may be easily destroyed either before the seed is planted or at the time of the first cultivation.

—From "Facts About Sugar," Oct. 19, 1918.

Meteorological Report

FOR SEPTEMBER 1917 AND 1918

Temperatures	1918	1917
Mean Maximum	70.20°	80.30°
Mean Minimum	41.57°	43.10°
Monthly Mean	55.89°	61.70°
Departure from Norm.	—4.11°	+1.50°
Maximum	90.00° on 15th	93.00° on 3rd
Minimum	32.00° on 30th	31.00° on 26th
Precipitation in Inches:		
To Date	16.83	10.94
For Month	1.71	0.87
Greatest in 24 hours	0.48 on 15th	0.45 on 14th
Departure from Norm.	+0.57	—0.24
Number of Days:		
Clear	11	9
Partly Cloudy	13	20
Cloudy	6	1

More About Siloing Beet Tops

Utah Farmer:

Last fall I siloed my beet tops in a pit silo about as the Utah Farmer advised us to do. We put the tops in the pit in layers and then drove a team and wagon over them, to pack them, after each batch was dumped in and spread out. In this way, we got them well packed. I let the little boy ride a horse around over the tops, especially around the edges. That helped to pack them down along the sides where we could not get to them easily with a team and wagon. We had so many more of the tops than we expected to have that we ricked them up and built up above the level of the excavated pit. We shoveled earth up against the sides to hold the tops from pushing out when we were finishing off the rick an then we shoveled earth over the entire lot. That helped to weight it down. I should have said that we spread some straw over the tops before we put the dirt on. I thought that would keep the dirt away from the tops and keep them from spoiling.

There is one thing that I don't understand:

In about two weeks after the silo was all closed up, I went out one day and I noticed a little steam coming out and I wondered what was happening so I pulled the earth away and worked my hand down into the top of the straw and tops and the farther down I got, the hotter it seemed. but I raked the dirt back and let it go. I dug into the pit in three places and later, when I opened the rick and began to feed the silage, every place where I dug into the top, the straw and tops were rotten. All of the rest kept just fine and it made good feed. I never did feed corn silage but I believe that the beet top silage is just as good. I am wondering what made the straw and tops rot where I dug into it.---J. E. M. Utah County.

Answer

The rotting was caused by allowing the air to get into the straw and tops. Making silage is a fermenting pro-

cess. When air is allowed to circulate the fermentation continues and the germs which cause decay will enter and the result is that instead of having a fermented silage, there is decay. It is imperative that the air be excluded. Sometimes the tops are siloed by just stacking them on top of the ground and not covering them. It will always be noticed, however, that around the edges and on top, there is a decayed crust that seals the interior mass and in this way, its own fermenting process seals it up but there is always waste in that outside portion which decays.

It is best to pack with earth or something that will seal it up. If beet pulp is to be fed, there is nothing better to top out the silo with than beet pulp. It is wet and packs readily and it has weight so that it also helps to settle the mass of tops and seal it up. The fermenting tops generate heat and this will help to ferment the beet pulp. One feeder who tried this plan last year said that he did not have any bother keeping his pulp from freezing as the heat from the silo kept the whole mass at about blood temperature, all through the winter. Then, too, the pulp is better feed after it has fermented. Heat will hasten the fermenting. Keep in mind that if straw is used in the pit, there must be more packing. It is not necessary to use straw with the tops.

Utah Farmer:

I got the impression from something that I read in the Utah Farmer that the beet top silage would keep only 60 days. Is that right? If so, when would we have to start feeding it?

Answer

It was not intended to allow a statement to come out through these columns that beet top silage would keep only sixty days. On the contrary, we examined silage that was not fed last spring and which was allowed to remain in the earth pit, along in August and the silage appears to be just as good as when they quit feeding it in March. After the silo is sealed up in the fall, the fermenting process needs from four to six weeks before the pit

should be opened and any of the silage fed. One feeder that we know of does not mean to start feeding the silage until late in February or March and then he will not need to turn onto his pastures quite so early in the spring. This will save tramping the pastures when the ground is wet in the early spring and give the grass a better start.

UTILIZING BEET TOPS AND LEAVES

S. M. Jensen

All kinds of feeds are too valuable this year to allow any to go to waste. If for no other reason you should silo your beet tops and crowns to help increase the livestock feed.

A number of farmers were talking about this beet top silage the other day and one man said, "he had plenty of hay and did not see the need of all this talk about shortage of feed." In some sections of the country we have plenty of hay and this is generally true all over Utah, but it is not true with some of our neighboring states. Even if one has plenty of hay why not save the beet tops and crowns and have that much more alfalfa hay to sell, if you do not have livestock to feed it to. Alfalfa hay is now selling at $15 to $20 a ton and any feed that will save a ton of hay is just that valuable.

Many farmers have not realized the value of beet tops and crowns. They have judged results by the way we feed them, or rather allowed the other fellow to feed them.

There is some value to your beet tops when allowed to remain on the land and pasture the livestock on them but the best results come when they are siloed.

This siloing process is so simple and so inexpensive that nearly every one can silo some tops.

Dig a pit or hole in the ground wide enough for a wagon to drive in, make the sides straight as the tops seem to pack better in a silo of this kind. Make it as long and as wide as you need. The only important thing about it is to so pack them down so that the air is excluded. They must be packed air-tight in order to undergo the siloing process.

As to the value of beet tops and crowns there seems to me no discussion, as every farmer with whom I have talked, that siloed beet tops, wants to increase his amount for another year.

Those who have used them are all boosters for this method of taking care of our beet tops and crowns.

It is a duty we owe our government at this time to conserve all the feed possible. If siloing our beet tops will help we ought to do it.—From "The Utah Farmer" Oct. 5, 1918.

SILOING BEET TOPS

Sunnyside, Washington, Sept. 23, 1918.

Utah Farmer, Lehi, Utah.

Gentlemen:

Following instructions given by the Utah Farmer, I had no trouble in making a perfect success siloing beet tops in a first year's experience.

Found it very practical to store away in a suitable pit joining my stable and corral enough tops to feed my family cow all winter. I cut my alfalfa hay bill easily in two and got more milk than by using all hay.

Another pit silo I located in a five-acre field. This I filled very economically by using a Fresno scraper. I built a permanent addition on the rear, over the lever or handle, and a loose arrangement on the front. I thus hauled a good sled load that was easily dumped in the pit, made a little wider than required for team and implement to pass through. I used no straw, but covered bottom with our alkali weeds—Australian Salt Bush. Straw was $10.00 a ton, hence the prohibition.

I would like to know if corn cut up either green as for a silo or dry from shock has been tried in alternate layers with beet tops in filling a pit or horizontal silo. It seems to me that the beet tops would supply the moisture we use in siloing corn and that the mixture would afford a ration that would bring good results.

Wishing to thank you for the practical information I have received through the "Farmer."

Very truly, H. M. Lechty.

Sugar Beet Molasses for Lambs

T. E. Leiper

IN order to determine the feeding value of sugar beet molasses, the Colorado Experiment Station placed 200 lambs in their lots on experiment, October 20, 1917. Lot No. 1 was fed whole barley in reversible troughs, and whole alfalfa in self feeder. Lot No. 2 was fed sugar beet molasses in reversible troughs, and whole barley placed on top of the molasses, while alfalfa was fed in the self feeder.

Barley was bought at $2.65 per hundred; alfalfa at $17.50 per ton; and sugar beet molasses at $25.00 per ton. The lambs were fed 102 days.

The initial weight of lot No. 1, the barley fed lot, was 61.81 pounds per head, and when finished, weighed 87.73 pounds per head, giving an average gain per head of 25.92 pounds; or .254 pounds gain per head per day. The average amount of barley fed per head per day was .95 pounds, while 1.25 pounds was a maximum feed. The lambs used 1.98 pounds of alfalfa per head per day, of which 7.8% were rejected. It took 374 pounds of barley and 779 pounds of alfalfa to make 100 pounds gain, at a cost of $16.75. The lambs shrank in transit, Fort Collins to Denver, 6.7%, and sold for $15.75, through Clay Robinson & Co., to Swift & Co. The lambs dressed 53.69% caul on and pluck in, and the average weight of the pelt was 13.2 pounds.

The initial weight of lot No. 2, the barley-molasses fed lot, was 62.45 pounds per head, and when finished, weighed 89.16 pounds per head, giving an average gain per head of 26.71 pounds, or .262 pounds gain per head per day. The average amount of barley fed per head per day was .757 pounds, while .9 pounds was maximum feed. The average amount of molasses fed per head per day was .295 pounds, while .46 pounds was maximum feed. The

lambs used 1.97 pounds of alfalfa per head per day, of which 8.9% was rejected. It took 289 pounds of barley, 112 pounds of sugar beet molasses, and 754 pounds of alfalfa to make 100 pounds of gain, at a cost of $15.59. This lot was sold the same way at the same price as Lot No. 1. The lambs shrank in transit, Fort Collins to Denver, 6.8%, and dressed 50.27%, caul on and pluck in, and the average weight of the pelt was 14.2 pounds.

These observations indicate that sugar beet molasses possesses about 75% the feeding value of barley, i. e., 100 pounds of sugar beet molasses will give the same gain as 75 pounds of barley. Further work will be needed to determine average results. In this particular experiment, molasses effected a saving of 25 cents per head on cost of feed.

For future information, write to the Colorado Experiment Station for bulletin on "Sugar Beet Molasses for Lambs."—T. E. Leiper.

A Communication on Tractors

Dear Editor:

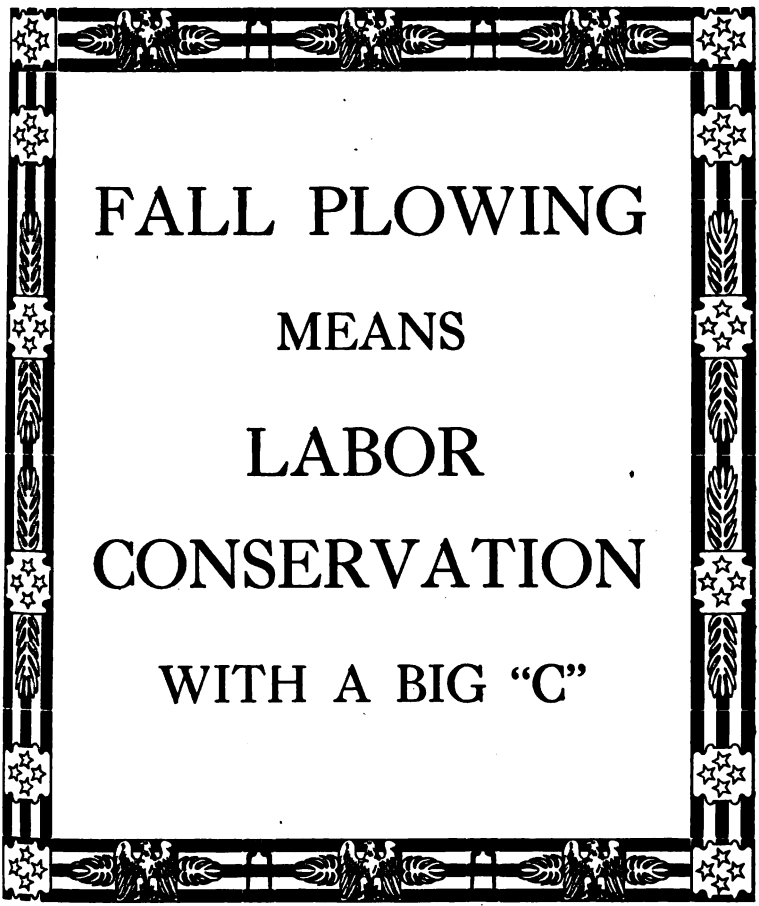
What do you know about farming? Have you ever been there, right there on the farm and doing the work? Well, if you haven't, maybe you have been there and been a "kid-glove boss." If either—and you had at the time a fair-sized bump of observation—of the 25, 50 or 100 farmers or hired hands that come under your observation, what per cent kept their tools in good working order, tight and in condition to do good work, and did good work? I would think 1 in 100, barely possible 5 per cent, for I never kept actual tab.

You posing to be a farmer's friend, eternally on the lookout for some way to assist and benefit the farmer, not you only, but hundreds of other farm papers, carrying the "farmers' best interest first and all the time" banner, all advise him to buy a tractor to do the work every day; balks not at heat or cold. Yet you, knowing how few

farmers have plow, harrow or wagon in fairly usable order; and how few do their work well, and raise a good fair crop, because the tools are not in fair working order---yet all of you, hullabaloo, 'Go quick, buy a tractor." Don't you know that the man who has a plow loose, wobbly, and if in use, flopping up and down, in and out of the ground, can't and won't keep a tractor in better working condition than he does the plow? That farmer whose harrow is shackley, tied up with bits of wire, a fair proportion of the teeth lost along the road and in the field, the balance worn off on one side, smooth and rounding, so they wouldn't crack a clod of earth even if the harrow be weighted with all his team could draw at a snail pace through the half-plowed field. The farmer who is so careless that he cannot drive his 12-foot harrow through a 15-foot gate without hitting one gate post---frequently both sides---yet he follows your advice and buys a tractor, bothers the life out of an expert for a year and then generally hauls the no-good thing into a fence corner or swaps it to another fellow who does no better. Don't advise such farmers to hire an engineer; the so-called traction engineers are worse than the farmer-owner, in every way the farmer's equal in carelessness and minus the ownership interest, lay or throw the tools where chance happens, frequently on a gear wheel, let it start up and a cold chisel, punch or wrench gets into the cogs, and a gear wheel is broken and the engine laid away until a new gear can be gotten from the factory.

The engineers are alike, whatever wages they demand, and the percentage of those who can and will take care of an engine is no larger than the percentage of farmers whose tools are in good condition.

There, publish that if you will. It don't do any good; the whole lot of farmers know their tools are not as they ought to be, but have not time to tighten the bolts, replace lost nuts and bolts or fix as it should be fixed, anything they have to use. Tie it up with a piece of wire and "we'll fix it after awhile." A. A. Weston, Julesburg, Colo., in "Western Farm Life" Aug. 1, 1918.


FALL PLOWING
MEANS
LABOR
CONSERVATION
WITH A BIG "C"

Fall Preparation of Sugar Beet Land

Mark Austin

General Agricultural Superintendent Utah-Idaho Sugar Co.

Important Suggestion on Preparation of Beet Land

Would like to again call attention to the farmers, suggesting that they plow up some of their worn-out, thin and weedy alfalfa by simply crowning it about two or three inches below the surface. Then thoroughly harrow the land to get the roots on top; if they lay there five or six weeks they will be thoroughly dried out and dead. Then plow them under this fall just before the ground freezes in November.

In the spring furrow out the land and thoroughly irrigate it. As soon as dry enough, harrow, level and plant. A splendid crop of beets may be secured in this way if the work is well done.

Alfalfa land, if properly prepared as above, will yield a heavy crop of foliage, possibly twice as much feed as hay grown on such land, say nothing about the beets that should yield about $125.00 to $150.00 per acre. We have grown 15 tons per acre on a 50-acre field in Idaho, even with their short season, when following the above methods in normal seasons.

In preparing grain land that has recently been plowed out from alfalfa, thoroughly disk the stubbles at once while it is damp, let it lay a few days so that all the weeds and grain seed will sprout, then plow it. This will give an excellent crop of beets next season.

During the next ten days every farmer in beet growing districts that has any such land or any other land suitable for beets should prepare it before the beet harvest and it will yield 3 to 4 tons, at least, more per acre next year than if left to be prepared in the spring. This difference in yield means about 30 to 50 dollars more per acre, say nothing about the additional amount of sugar that will be produced, that is so much needed.—From "Utah Farmer" Sept. 28, 1918.

Watch the Bean Thresher

SEVENTEEN per cent of the 752 carloads of pinto beans purchased by the United States Grain Corporation last spring were rejected because the beans were not up to grade. An excess of split beans was the cause of the greater portion of the rejections. Careless threshing and the use of grain separators instead of bean hullers was responsible for the large percentage of the split beans. This information was imparted to the Colorado Bean Growers' association at a recent meeting in Denver by O. H. Liebers, representative of the United States Food Administration, who handled the big government purchase at this end of the line.

Another cause for rejections, although not as serious as that of split beans, was the presence of stones and dirt in excess of the grade minimum. Mr. Liebers cited one case of a large catering company in Chicago, who decided, after trying a carload of pintos, that they would use no more, because their patrons complained of stones in the cooked beans. The problem of eliminating the gravel and hard bits of adobe that stick to the beans is a difficult one, as these particles are often the same size and weight as beans and, therefore, are not readily removed in passing through the cleaner. Hand picking may be the only solution of this problem, though there is a machine now being tested that seems to do the work. This is a question for the cleaner to solve.

The split bean problem is strictly up to the grower. It is certain that, in order to establish a permanent market for pinto beans in the east, this product must be put up in a manner that will stand comparison with the hand-picked product of the navy bean districts of New York and Michigan. We may be able to "get across" with some of the poorly graded stuff now because of the great demand for food of all kinds, but if we hope to make a

permanent place at good prices for pintos they will have to reach the consumer in first class table condition. We might as well face that proposition now while the demand is at floodtide and reap the benefits that will come from marketing a properly cleaned and graded product. Right now is the time to look after proper threshing of the beans.---From Western Farm Life" Sept. 15, 1918.

Rules For Measuring Hay

IN the measurement of hay there are two points to be considered. These are the number of cubic feet required to make one ton and the method of determining the number of cubic feet in a stack.

The following table gives the number of cubic feet required to make one ton of alfalfa at various seasons of settling these figures being accepted as fair amounts to allow for a ton:

Number of days in stack	Number of cubic feet per ton
30	560
60	540
90	512
120	485
Late winter	450

Native hay packs more closely, the usual figure being 422 cubic feet for one ton in a well settled stack.

There are three general methods of arriving at the number of cubic feet in the stack. All three methods require the width, length, and over-measurement. The latter is the distance from the ground on one side, straight over the top to the ground on the other side. Where stacks are irregular, it is best to secure a number of measurements for width and length and the over-measurement, and use the average.

RULE I. One-fourth of the "over" multiplied by the

width, then multiplied by the length and divided by the required number of cubic feet to make one ton. This rule gives accurate figures on small, squat stacks when the width is from one-third to one-half of the "over."

Last fall the Experiment Station bought 98.55 tons by the use of this rule, and when weighed out it weighed 98.18 tons.

RULE II. (Colorado Rule). Subtract the width from the over. Multiply one-half the result by the width; multiply the product by the length; divide by the number of cubic feet required to make one ton. This rule is most accurate when the width exceeds one-half the over.

RULE III. (Government Rule). Width plus "over," divided by four and squared; then multiplied by length and divided by the number of cubic feet required to make one ton. This rule is satisfactory for large tall stacks of 25 to 45 tons, and favors the seller with ordinary small squat Colorado stacks.---T. E. Leiper, State Agricultural College, Fort Collins, Colorado.

Don't Waste Sugar

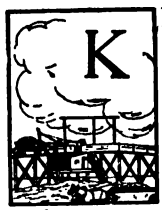
H. H. Griffin

The Food Administration is taking precautions to see that no waste is allowed in the manufacture of sugar. This is perhaps easily accomplished because everything is centralized.

However, this loss may be a considerable amount in the beet or raw product as it comes from the field by topping the beet too low. Many tons of sugar may thus be left in the field, and consequently a waste to the farmer, Sugar company and to the people.

Watch carefully to see that proper topping is done, and, if necessary, call the field force to your assistance.

Why Keep Accounts?



EEPING farm accounts is not only an advantage; it is a necessity. Since farming people have to make income tax returns just the the same as other business people, it is absolutely essential to have figures upon which to base reports. Hence every farmer ought to keep accounts. The time necessary to keep accounts on the farm need not amount to more than six hours a year. At the end of the year the banker or county agricultural agent will be ready to help in balancing the books, or taking the inventory which is necessary.

There are at least four important reasons why men on farms should keep accounts. The main one is to have a definite method of studying the business with the idea of making it more profitable. If farmers were to produce wheat or other farm products without a profit, soon agriculture would suffer.

A second reason for accounts and farm records is that they improve a man's credit. If a farmer can show from carefully kept records that the money he wishes to borrow is to be used for a purpose that will increase the profits of the farm, then he will be able to get a loan more readily on better terms.

A third reason for accounts is that they often are the means of agreeably settling disputes or misunderstandings that otherwise might occur between parties who deal with one another and who never keep any record of their business transactions.

A fourth reason, and not the least important, is that a man owes it to his family to make use of every means possible to detect and prevent leaks in the farm business, and thus make the farm income sufficient for the support of the family and the education of his children.

Farmers who are keeping books can take advantage of the ruling of the United States Treasury Department which provides as follows:

"Farmers who keep books according to some approved

method which clearly shows the net income, and take annual inventories, may, if the same method is consistently followed from year to year, prepare their returns in accordance with the showing made by the books and the inventories."—From "Farm Journal." Oct., 1918.

Bean Growers Get Busy

GROWERS who have been relying on the government to take over the 1918 crop of pintos are doomed to disappointment. There is no intention on the part of the United States Food Administration to repeat the good work done last spring. When approximately 60,000,000 pounds of beans were bought in Colorado and New Mexico for general distribution in eastern markets, in order to stabilize food prices in the East and encourage a new Western industry. As far as known, the grower will be on his own resources this season, except that the government will make large purchases for army use and, probably, there will also be an outlet for some of the pintos to the civilian trade in European countries. All of this, however, will have to be handled through regular market channels and not, as was the case last spring, through the United States Grain Corporation.

At a poorly attended meeting of the association held in Denver late in August, F. S. Ruggles and T. Wade, representatives of the United States Bureau of Markets from Washington, offered to furnish a plan of co-operative marketing, if the Colorado growers desired it. Action on the proposition was deferred until the growers throughout the state could be made acquainted with details. This is being done at present by Messrs. Ruggles and Wade, who are addressing meetings of county growers and assisting in organizing these units as a part of the present state organization.

The association has declared in favor of joint inspection

service to be established at Denver, growers, jobbers and the Colorado Grain Exchange co-operating. A joint committee from the three bodies is to decide on details. The beans are to be inspected on sample, this inspection to be official. The Rocky Mountain Bean Jobbers' association grades, which were in effect for the 1917 crop, were again adopted.

It was decided to increase the membership fee to $1.50 per year, fifty cents to be retained by the local unit of the organization. A resolution was adopted asking the New Mexico growers to co-operate with the Colorado association in improving the growing and marketing of the pinto bean crop.---From "Western Farm Life" Sept. 15, 1918.

Hold on to Farm Mortgages

Whether peace comes soon or late it will find Europe in the bread-line and close to starvation. Every particle of food that the United States can produce will be urgently needed on the other side of the Atlantic, so that there is little danger of a slump in the demand for agricultural products, and agricultural prosperity if not permanent is certain to continue for several years.

When the enormous sums now invested in the manufacture of things needed solely for war purposes are set free they must be diverted to other channels. What investment is more secure than a farm mortgage?

We would impress three things on all holders of farm mortgages: 1. The patriotic and sensible thing to do is not to "call" such mortgages when due. 2. Renew such mortgages when requested. 3. If possible, increase your farm mortgage investments, and endeavor to influence other investors to do likewise. It should be remembered that all financial requirements of farms can not yet be entirely met by Federal Farm Loans---the private investor must do his part too in order to win the war, and make agriculture permanent.—Farm Journal, October, 1918.

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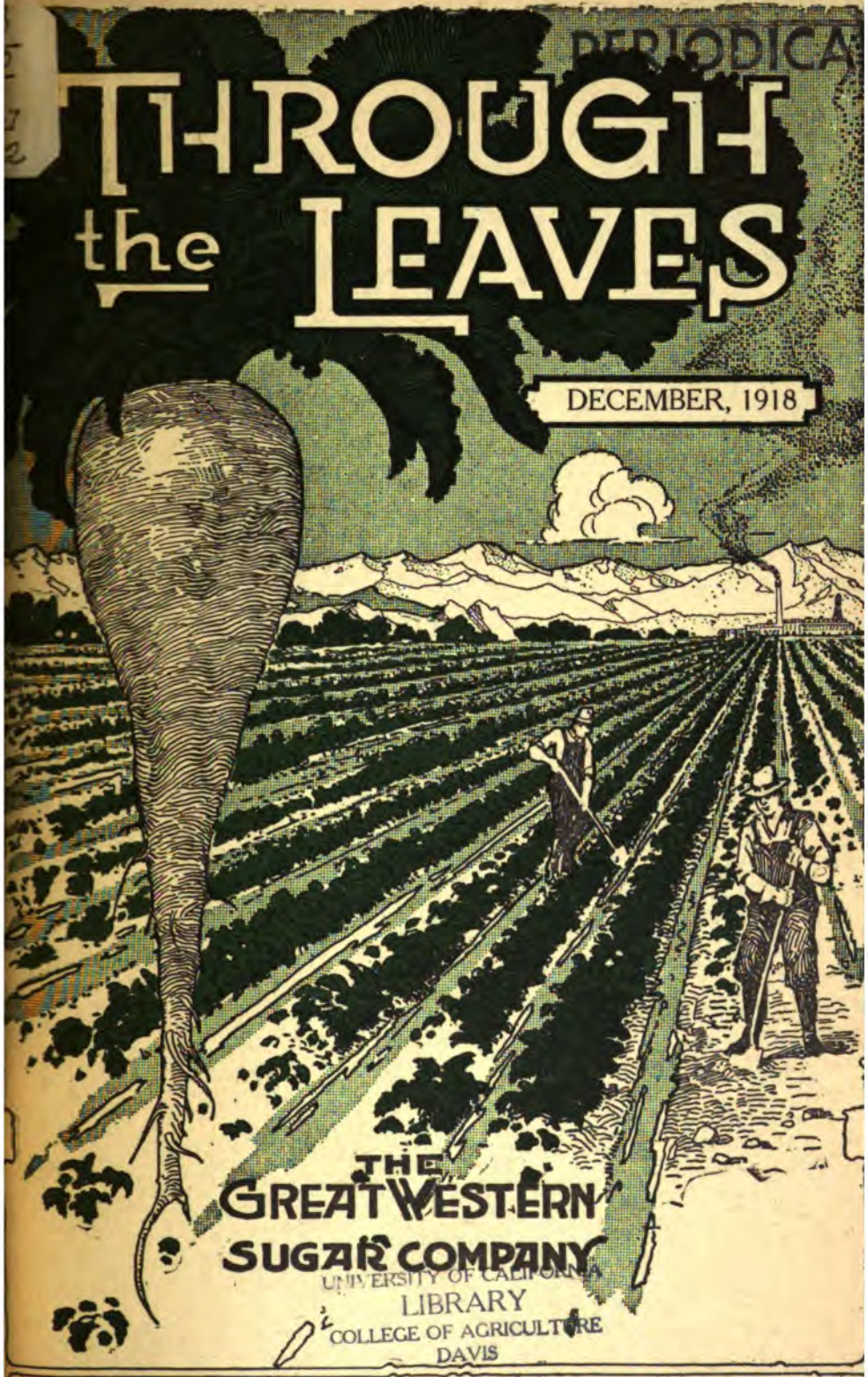
THROUGH the LEAVES

DECEMBER, 1918



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THROUGH THE LEAVES

DECEMBER, 1918

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1918

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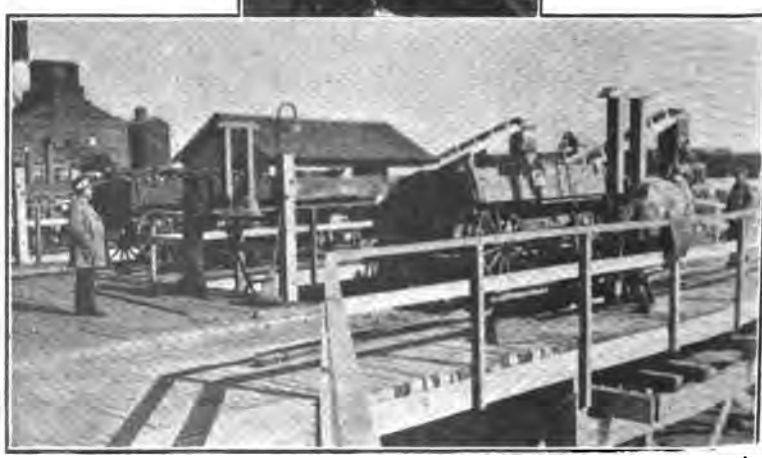


Upper---Belt Conveyor, Belt No. 3, conveying beets in our shed, Greeley, Colo.
Center---Belt Elevator, Belt No. 1, Greeley, Colo.
Lower---Dumping two wagons at once, Greeley, Colo.

The Editor's Page

A year ago we urged the farmers to plan their crops so as not to break up their regular system of crop rotations. Many probably thought that our whole idea in urging this a year ago was a selfish one to get a greater beet acreage; and while no doubt selfishness prompted the idea, yet we believe it was sound wisdom. A great many farmers did not change. Not because of our urging, but because they also believed that the business of farming calls for a consistent regular program that cannot be broken up because a particular commodity seems to offer easier immediate returns, and while a year ago the "pot of gold" seemed to lie in the wheat field, this was found to be somewhat chimerical and many chased it more or less in vain.

We are just as strong in our convictions now that a WELL BALANCED SYSTEM of crop rotation should not be changed, even though at this time the tendency seems to be toward sugar beets. We believe all irrigated farms in Northern Colorado within a reasonable distance of a receiving station can and should grow a cultivated crop each year to the extent of 25% to 35% of their acreage. We also believe that the sugar beet can be depended upon one year with another to give a good accounting. General conditions and returns during 1918 have brought the sugar beet into much favor and we hear of farmers planning to plant a large part of their farms to this popular crop in 1919. The same principle of consistent crop rotation applies now just as truly as they did last year. We can consistently urge preparations for a good sugar beet acreage, but don't go to extremes.

News from Factory and Field

Longmont Factory

The good weather and early finish of harvest have made it possible for a large number of growers to do Fall plowing, and we are glad to see so many taking advantage of these favorable conditions. We know that beets planted in April have a much better chance to make a twenty ton crop than beets planted the latter part of May. Fall plowing makes this early planting possible. It also means that the lessened amount of work to be done in the Spring allows for the seasonable planting of all crops.

* * *

Up to date cattle have been coming in rather slowly. Of course we do not look for quite the usual number this year because of smaller beet acreage and a consequent smaller tonnage of pulp. Thus we see a smaller beet acreage means less pulp, which menas fewer cattle and less fertilizer, so that sooner or later the entire community sustains an economic loss in the future poorer yields as well as an immediate loss from a diminished feeding industry.

* * *

Beet tops have been commanding a much better price this year than ever before, $6.00 to $10.00 per acre being common prices. A few fields have sold as high as $13.00 per acre, and one field brought $15.00 per acre for the tops in the field. Feeders are beginning to realize more than ever the value of this by-product.

* * *

Hay seems to be moving rather slowly. Some sales at $10.00 to $12.00 per ton, but most feeders feel that $10.00 is about all they can offer for the poor quality hay that is to be had.

---N. R. McCreery, Agricultural Superintendent

Brighton Factory

The harvesting of the 1918 crop is now a thing of the past and if the weather had been ordered it could not have been better. Everything has gone along so smoothly that we hardly have realized we have been through a campaign.

Judging from reports and also talking with the growers, they all seem to be satisfied with the yield and the crop in general. Our average tonnage for this district is about two tons increase over last year, and while the past season has been very favorable for the beet crop, I do not think that it all had to do with the increased tonnage, but that the growers responded nobly to the call of our country and did their utmost to produce the maximum tonnage, and by so doing helped to bring the greatest of all wars to a successful ending. Let us continue to do this for by so doing we not only helped win the war, but also made good returns for ourselves.

* * *

In some localities I have noticed quite a number of growers crowning alfalfa and plowing for next year's crop. I certainly would like to see more of this done, where it is possible to do so, especially in the heavier soils, for in this age it is an undisputed fact that fall plowing is way ahead of spring plowing for any kind of a crop, and besides it does away with the big rush in the spring which is quite an item, especially if it happens to be a late wet spring. During these winter months when there is not so much to be done on your farm, is a good time to prepare for next year's work by getting your plows, cultivators, and all other farm implements in shape, so that when spring opens up, you will be ready to go and no time lost.

* * *

I see quite a number of farmers hauling their hay to the alfalfa mill. Now wouldn't it be better to feed a carload or two of cattle or sheep, or run a herd of dairy

cows? By so doing you are not taking everything off of the farm but putting it back in the form of manure, which makes it possible for you to take the maximum yields from your land and also keeps it in a high state of cultivation. Besides all this you also have a chance to make good returns from your cattle feeding operations, and if you only break even, you are still ahead when everything is taken into consideration. Think it over.

* * *

August 29th we sent out letters with return postal cards to all our growers, requesting them to state the number of tons of pulp wanted and to have these cards returned to us not later than September 20th. Quite a number were returned but there were also many who did not, and some of these are now making inquiries as to their allotments. We waited for these cards until October 15th, before alloting the pulp, so do not blame us if you do not get your share, and next year try and let us know in time. It is our intention to give all growers the same chance and if they do not take advantage of it, we do not feel that we are to blame.

---C. F. Johnson, Agricultural Superintendent.

Loveland Factory

The beet harvest was finished this year in record breaking time, most of the dumps having already closed down. There were no delays whatever, and the weather was all that could be desired.

* * *

One farmer at Hardman dump harvested 80 acres of good beets and delivered them at the dump in 30 days. Can anyone beat it?

* * *

We have a larger percentage of twenty and better tons per acre this year than we have had in the last ten years, and the average tonnage on measured acres for the Loveland factory this year will be close to 14 tons per acre.

THROUGH THE LEAVES

Since beet harvest is finished, nearly all the beet growers are making use of the good weather by plowing their beet land for next year. The results obtained on fall plowing have been so marked in the last two or three years that it has greatly stimulated efforts in this direction.

* * *

From the many discussions on the pulp question, it would appear that a great many people grow beets simply to get pulp; but everyone wants about 300 per cent in pulp on the weight of beets delivered. Wish we could give it, and cut out the discussions; but we are trying to make a fair distribution, and that is all we can do.

* * *

There do not seem to be so many cattle on feed in this territory this year, a good deal of the pulp supply being fed to dairy herds. Some of the feeders are afraid the price of beef is not going to be in proportion to the price of feeders.

* * *

One of the dealers in tractors came up and gave an exhibition of pulling a heavy load of beets over the dump with a small Cleveland caterpillar tractor. It did the work perfectly easy, and it looks like the small caterpillar tractor would be the coming power for this purpose. It could easily handle two good loads on the road, and makes much better time than a team. The team could be used to load in the field, and keep the tractor on the road and greatly facilitate the handling of the crop.

* * *

We have been conducting some experiments with a blower to handle beets from the pile to the car. A large fan run by an electric motor furnishes the air to take the beets up and discharges them through a pipe into the car. There are good possibilities to the machine, which we are trying to develop, and if it works the plan would save a great deal of hard work.

---H. Scilley, Agricultural Superintendent.

Ft. Morgan Factory

Morgan and Washington counties have a very effective road maintenance system. This road picture was taken after 150,000 tons of beets were hauled over them and de-delivered to our dumps. Through a co-operative arrangement existing between the Great Western Sugar Company, Morgan and Washington counties, 222 miles, all as good as this cut, were constructed and maintained at a cost of $60,680.00 or $275.00 per mile, inclusive of the maintenance cost for three years.

Farmers are loyal suporters of our road co-operative arrangements and we know of several specific instances where farmers have sold off some of their draft animals since these roads were put into their present state of repair, which facts are partly born out by the fieldmen's survey made in 1917 of all sugar beet producing territories in which The Great Western Sugar Company operates. This survey shows that it requires 5.1 draft animals in the Morgan territory per every 100 acres farmed, compared with an average of all Colorado territories of 6.6 draft animals per 100 acres and the average for the county of 5.7 draft animals per 100 acres farmed.

This is a decided saving to the farmers. The farmers are of the opinion that this road program is entitled to most of the credit. The beet acreage of Morgan and Washington counties in 1918-1919 was nearer normal than any other territory. The road maintenance system had a considerable influence on the producers of raw material; and kept the sugar output of our Morgan county factories almost up to the 1917-1918 production.

—H. C. Giese, Agricultural Superintendent.

Windsor Factory

The crops in this district have been very satisfactory this year, unless it would be the bean crop, of which the most has been seed beans. While a few of our farmers have had a good crop, the majority have been poor and a very unsatisfactory crop to them.

Alfalfa has been a good crop but a great deal of damaged hay will be fed on account of local showers during haying time.

The wheat crop was the best for several years in the irrigated district, but delays in threshing on account of storms was the cause for a great deal of damaged grain.

The potato crop is just fair in this district with a light acreage, so we have chosen the beets for our banner crop of which we are proud to say will be one of the best in Northern Colorado, if not in the state.

* * *

The farmers are just as enthused over their crop this year and are giving us all the encouragement we want for a large acreage next year.

* * *

The Windsor district will harvest fifteen tons to the acre, or a little better.

* * *

Climatic conditions in the Windsor district during May and June were probably some better than normal. The good yield, we think, is due more to the fact that the growers are working more to the yield per acre than to having a large acreage, consequently the beets are gradually getting better care every year, which brings increased earnings per acre, which should be the aim of all farming operations.

We also credit our field force with having contributed to this excellent yield and beg of our growers to treat them kindly as this is the way they have of making a living. We hope that you will continue to call for their services at any time that they can help.

The Windsor Factory farm has grown 196 acres of beet seed this year, which we estimate will yield not less than 1800 lbs of clean seed per acre, which is a good yield. The seed is of very good quality.

We have 98 acres of Stecklings this year which were good and are now safely siloed and will plant about 400 acres beet seed next year.

Our Steckling siloes measure 11 16---100 miles in total length.

Sterling Factory

We have had very good weather all the way through, very few frosty mornings, and they were so late in the season that we could take care of all frosted beets very handy. The total crop was a little over 143,000 tons.

* * *

In this district we opened up scalehouses almost at any time in the morning so as to cause as little delay to the farmers as possible. If a station had wagons there at six in the morning, our help was there to receive them. A great many of our crews were paid for twelve hours, and I think it was satisfactory to the farmer.

* * *

Quite a little fall plowing is being done here, but a very small amount of manure is being hauled out even though it is plentiful. Our yield at Factory station is very little larger than at other stations, and it should be, and can be increased by the landlords insisting that renters haul so many loads of manure every year. The Company has never charged for it, and that may be the reason that farmers don't want it.

* * *

We think the outlook for another year is good towards more acres, also better yield.

.---Chas. E. Evans, Agricultural Superintendent.

Our home grown seed compares very favorably with any foreign seed that we have ever received, eiither for tonnage or sugar.

Raising of beet seed is a very particular job of intensive farming, and while the Agricultural Superintendent is a busy individual he would be pleased to have the opportunity to show any of the growers over the Sugar Company farm and explain the growing of beet seed at any time.

Greeley Factory

The state and county election is something of the past and the results have been satisfactory to some and unsatisfactory to others, as a natural result that follows victory or defeat. And there is another victory that all Americans and all the people of all the allied nations should be and are proud of; the grand victory in subduing that bloodthirsty monarch, the Kaiser. With all the above grand achievements, which will go to make history for America and foreign nations, we as Americans should be proud of our part in such a grand victory with such small loss.

But what I was going to say was, victory does not increase our tonnage of sugar required to supply the allied nations for the present time and I find that by reason of climatic conditions in northern Colorado that some of our crop was a great deal under the normal production. This will result in a very little profit to the farmers for the past year.

Now we have a great many calls for beet thinning work for the coming season. As we only have a normal supply of beet workers on hand who live here and indications are that there will be a great deal larger beet acreage signed up for 1919 than we had in the past few years, so in order to supply labor for a large acreage for 1919 beet crop I feel that it is necessary for the farmers to engage their help as soon as possible, even before they get their beet contract as almost all farmers know about how

many acres of beets they expect to plant for the coming year. By contracting for the help that is on hand, it will give us a chance to secure the balance of our beet help without any serious trouble.

But we cannot induce a great many beet workers to come to Northern Colorado until the supply on hand has been exhausted. If the farmers will, as I said before, engage what help there is on hand as soon as possible, we know that there will be plenty of beet help for everybody for the coming year. By securing your help early, you have a better chance for more efficient help and you will give us a better chance to secure better help.

Some will say, "We do not know what the price will be," and that is true , but that will not stand in your road to engage your help. Engage your help first and you can fix the price later which will be satisfactory

* * *

Now that there will be a great increase in beet acres for 1919 all over the West, what we want to impress on our beet growers is that this will require more beet help. We have always had plenty at Greeley and we expect to always have plenty, and with the help of the farmers, we think that we will be able to improve on the quality of our beet help in a short time.

Yours for a better crop year,

---H. Timothy, Agricultural Superintendent.

Billings Factory

Seventy-two of our growers entered beets in competition for the cash prizes offered by the Billings Factory for the best ten sugar beets to be exhibited at the third Midland Empire fair at Billings, Septmber 17th to 20th inclusive.

David Schmidt, of Mason, Carbon County, won the first prize of $25.00.

George Ostermiller, of Billings, won the second prize of $15.00.

Robert McPhail, of Hysham, Rosebud county, won third prize of $10.00.

The entire display comprised 720 beets, making a very large display, which called forth much favorable comment from Fair visitors. The work of the judges was extremely difficult, from the fact that the majority of the exhibits submitted were of splendid type of beets from both field and factory standpoint.

* * *

We had ideal harvesting weather from the time the harvest opened until November. 5th. Election day found us with from two to ten inches of snow over the entire beet district. This blanket of snow protected the ground from freezing during the two cold nights following, but the warm weather later put a crimp in the beet harvesting, as the bottoms went out of the fields and roads.

The weather has cleared since, and while the fields are very wet, we have no doubt that we will harvest every beet.

* * *

Most of the growers, who had beets in the ground when the storm came, were those who did not start until late in October, some for very good reasons, others apparently without reasons. Influenza in some districts almost totally demoralized the harvest, and the hauling of beets. These conditions have improved decidedly since the snowfall.

* * *

Inquiries from previous years' growers, who have not been growing beets the past two years indicate that a great many of them intend to put out beets next year.

* * *

Our Agricultural department is in receipt of numerous inquiries by letter and personally, for beet farms for next year, which is also a very good indication that our acreage next year will be much larger than this year.

—C. S. Milhiser, Agricultural Superintendent.

Missoula District

While we started our campaign under very unfavorable conditions, we are pleased to state that relief arrived about October 15th. From that date we have had excellent harvest weather, and completed our deliveries yesterday, Nov. 22nd.

* * *

We have had no frost except one, which tipped a few beets at Deer Lodge, so that we had no occasion for controversy with the growers on this point.

Sweet peas and beautiful roses from the gardens have been very much in evidence up to November 17th.

* * *

Our railroad companies here have given us excellent car service, necesitating very little piling at stations.

Influenza has been very bad in this district and especially so on one of our own farms in the Bitter Root valley. From this farm we have taken seven men to the hospital and as many more had to go home, but we are pleased to say we have had no fatalities.

* * *

Farmers have been busy fall plowing for over two weeks, with the land in splendid condition. Several mornings the frost was too deep to break before 10 o'clock. We do not expect to be frost bound yet and hope to get a lot of land plowed before the first of the year. Last season plowing continued until January 10th, then we had a chinook in February and plowing commenced again on February 12th, with most of grain seeding in March.

* * *

On account of a heavy fibrous root in many places we had a very heavy tare, but with an open tarehouse and an invitation to growers to examine our system, we have had little or no complaints.

* * *

Beet settlements all over seem to have been very satisfactory to growers and tonnage very good.

We are in need of some good tenant beet growers in this district and as we understand there is a surplus of same in northern Colorado, would be pleased to get in touch with some of them, as we hope to be able to give reasonable rentals.

—R. M. Barr, Agricultural Superintendent.

Nebraska District

Herewith is shown, standing beside his beet hauler's wagon, one of the youngest beet growers in the North Platte Valley.

Martin Gable is 15 years old and a son of W. H. Gable, one of the most prominent farmers and sheepfeeders in

western Nebraska. He is as enterprising as his father and has given us the results of one of his experiments, which was raising exactly one acre of sugar beets and keeping an accurate account of his expenditures and pro-

ceeds from the same. Where work was done by himself he has used the average price for such work among his neighbors. Below you will find entire cost and proceeds for the one acre.

Cash rent paid	$24.00
Plowing	3.50
Harrowing	.50
Seed, 18 lbs.	1.80
Planting	.50
Breaking crust	.50
Cultivating 5 times	2.50
Irrigating 3 times	3.00
Hand labor	25.00
Pulling with team	2.50
Hauling 18.38 tons first, net $1.00 per ton	18.38
Expenditures	$82.18
Received, 17.824 tons at $10.00 per ton	$178.24
Received for tops	12.00
Gross proceeds	$190.24
Expenditures	$ 82.18
Net proceeds	$108.06

The above has been given as it might be an inducement to other young farmers to try raising various crops keeping an account for each, thereby gaining valuable information for themselves as well as others.

* * *

With the exception of one light snow the month of November has been just as favorable to farmers as any previous month.

* * *

Although a few farmers finished delivering their beets in October, the majority are anxiously awaiting the fifteenth of December for their final beet check.

—W. A. Nelson, Agricultural Superintendent, Scottsbluff.

Ft. Collins Factory

IDLE ACRES

During the present shortage of food for both man and animal, our farmers have tried to make each acre produce the maximum amount of crops, and in almost every instance have succeeded, but how about the "idle acres?"

Are the farm buildings planned to take up the least room for their purposes?

In the irrigated districts the ditches are a necessity, but oftentimes take up more room than they should, especially the farmer's laterals. Of course they must follow a certain grade but some farms could be irrigated with one-half the number of permanent ditches, saving the land they occupy and making the individual fields larger, which is very necessary during these times when the tractor is taking the place of the horse.

Our public roads are laid out in a very extravagant manner.

During the settlement of this country wide roads were necessary because at that time large herds of cattle were being driven from one range to another. An eighty or sixty foot road became common and finally laws were enacted making them legal.

As the agricultural interests developed the roads were graded, graveled or paved About forty feet was used, the other twenty (ten on each side) was abandoned for road use, only to grow up with weeds. The landowner pays taxes on the roads; why ask him to abandon a ten or twenty foot strip and then compel him to keep that strip, which is generally occupied by telephone or electric lines, free from weeds?

The telephone or power companies set their poles a few feet from the fences so that their cross arms will not hang over the fence line. Why not move the fence out ten feet and give the companies the right to set their poles

on the fence line, saving about 2.4 acres of land for every mile of road? Our highway engineers may favor the sixty foot road for the more important highways, but why all roads? May not the side and out of the way roads be narrowed to forty feet? Our laws demand public roads to be sixty feet; can't we change them?

We have just passed through a period of radical changes from the old established "ruts." After peace is declared, our highways are going to be improved as never before. Why not wipe the slate clean and stop this wastage of acres which is the most productive land in the world?

—C. F. Osborn

* * *

DON'T JUST HOUSE HENS—GIVE THEM A HOME

Now that our beet harvest is over and winter is coming on, let us look to some of the smaller issues on the farm. I am referring in this article to the proper housing of chickens on our average farm.

I speak of giving the hens a home. By this I mean a house that is convenient, comfortable, light, dry, well ventilated, free from drafts, clean from vermin, and at the same time inexpensive.

A hen house is not always a hen home. The former may be cold, dark, and damp while the latter should be light, clean, cheery and comfortable.

The poultry house should be convenient, that is, it should be close to the other buildings and easy to keep clean. A cheap house built along the right lines and kept clean will serve just as well as an expensive house. Build your house of material which is easy to keep clean. Labor costs money, so put in as many labor saving devices as you can afford, such as dropping boards, feed bins, self feeders, etc.

The house should be comfortable. This refers to both you and the hens. It should not be built so low that it is uncomforable to work in—five and a half feet at the rear and seven and a half feet at the front is desirable. The

hen is a great heat maker, her temperature is 102 degrees and the heat thrown off by a flock of one hundred hens in a house of this height will keep the house at a safe temperature even though the thermometer drops below zero.

The house should be light, sunlight is the best germicide in the world. The house should face the south and should have two or three large openings on this side so as to permit the sunlight to reach clear to the back of the house. These openings should not be closed up tight with windows in the winter, for if this is done, the moisture condenses on the wall and keeps the house damp. The cold will not hurt the hens, but they cannot stand sudden changes in temperature. Have a muslin curtain arranged so that it can be dropped over the openings to prevent freezing their combs on cold winter nights. These curtains will keep out the snow and wind, but will let the air pass freely through them. In this way the ventilation will take care of itself. The other three sides of the house should be tightly boarded.

The house should be dry. Build the house on a dry, well-drained place as nothing causes diseases in chickens more quickly than a cold, damp house.

The house should be kept clean. A farmer cannot clean the house every week as a poultryman does, but he can keep fresh straw on the floor and have dropping boards under the roosts and clean his house out once in a month at least. It should be white-washed and disinfected at least three times a year. These precautions will, to a large extent, do away with troubles from lice, mites, etc.

These are only some of the general principles that I am suggesting in regard to the proper housing of the farm flock, and, if they are fed properly, they will more than pay you for your trouble, and will be an asset rather than a liability on your farm.

---J. L. Williams

Rotation on Paper and on the Farm

H. Mendelson

IN the November issue of this magazine we pointed out that one essential feature of the farming system of the beet districts in Northern Colorado is:

One-third of the cropped land in alfalfa;
One-third of the cropped land in small grain;
One-third of the cropped land in intertilled crops, like beets, potatoes, beans, corn and truck.

This appears to be an ideally balanced system. It is being advocated in other farming districts. It is used on almost every individual farm insofar as almost every farm raises almost every year crops belonging to the three classes, although by no means in the proportion given.

Neither is the sequence of the crops in different years the same. That is, beets are often raised after beets for several years. The high wheat prices have induced many farmers to raise wheat on the same piece of land several years in succession.

A regular system of rotation is advocated, however, by many and practiced by a few.

The farmers of our districts are notably progressive, that is, they take hold of new things more quickly than farmers in older farming communities. The evidence for this is to be found in the quickness with which new crops are spreading. It was no small accomplishment. for instance, when the acreage of beets in Northern Colorado was increased from 5000 acres in 1901 to 70,000 acres in 1909 and 140,000 acres in 1916.

In the Scottsbluff district it was increased from 6000 acres in 1910 to 40,000 acres in 1917.

Three years ago hardly 1000 acres of beans were grown in Northern Colorado. Last year we had nearly 70,000 acres.

Compare this with the difficulty experienced in states farther east when introducing alfalfa.

If, then, our farmers quickly adopt new good things, why don't they adopt a systematical crop rotation as advocated by many talkers as well as farmers?

The case for systematical rotation evidently is not quite so strong or the immediate advantages are not so apparent as many of us believe, or else it is the old story of human weakness preventing a translation of a well founded faith into deeds.

There are very few agricultural practices absolutely the best under any and all circumstances. Weather and soil conditions change from year to year, so that a certain procedure may be entirely successful for four years and fail in the fifth.

For instance, many farmers manure and plow for beets in the spring. In an extraordinarily dry spring the seed bed will dry up before the seed can germinate, and the layer of strawy manure between the moist subsoil and the dry top soil hastens the drying out of the top soil. Still many farmers persist in the practice of spring plowing and manuring, because they get by with it, say three times out of five.

Many farmers have learned that a comparatively late last irrigation for beets gives a considerable increase in yield. This, of course, is particularly noticeable in dry falls. If, however, you have irrigated heavy soil late in September and you get a heavy rain the beginning of October, you have such difficulties in harvesting the crop and the beets are so dirty that you probably wish you hadn't irrigated your beets so late. So next year you stop irrigating much earlier. Then a dry fall comes. The soil is too dry and hard. It takes extraordinary horse power to pull the beets. The puller breaks many beets and you wish you hadn't stopped irrigating so soon.

Chances are that your unfortunate fieldman advised you to do what you did and your opinion of his wisdom is not very good.

Take, for instance, the case of the silo. While there are

certain undisputed advantages of corn silage, there are still many successful farmers in the corn belt not using the silo, showing clearly that the silo is not the only way to utilize the corn crop properly and successfully.

Therefore it must be admitted at the outset that systematical crop rotation, like any other farm practice, is not necessarily the only successful plan and is bound to be sometimes not as good as some other practice.

A. Rotation on Paper.

What exactly are the advantages claimed for systematical crop rotation?

1. The first advantage can be stated in the words of the old saying, "Don't put all your eggs in one basket." This means that for various reasons some crop is occasionally a failure either as to yield or as to prices. It is unlikely that three crops as different from each other as, for instance, alfalfa, grain and beets, will all fail in the same year. Therefore a diversity of crops is an insurance against total failure.

2. Different kinds of crops make for a better distribution of man and horse labor, so that one man can handle more acres in three crops than in one crop alone.

For instance, you would need a certain number of horses even if your farm were entirely in alfalfa. But you would have virtually nothing for the horses to do from the time the last cuting is in the stack until the first cutting, or about eight months. With the same horse equipment and the addition of some implements, you can plow some land, plant it to beets before the alfalfa harvest begins, cultivate and irrigate it between the different cuttings, and harvest it after the alfalfa is all in the stack. Of course you will hire the contract hand labor. Outside of that you can well limit your beet acreage so that no hired help is required.

You would make more out of beets and alfalfa than of alfalfa alone, largely because the additional beet crop allows you and your horses to work more days in the year, provided the receipts of the beet crop per acre are enough higher than those for alfalfa to take care of the extra ex-

pense of hand labor, the extra grain feed for the horses while they are working on the beet crop, and the interest and depreciation of the implements bought especially for the beet crop.

The same reasoning, of course, holds good for any other crop. These two advantages: Insurance against total failure and better distribution of work, can be had without systematical crop rotation by mere diversification of crops. That is, you could keep the same fields in alfalfa every year, the same field in beets every year and the same field in grain every year, and still have the advantages claimed above.

3. The additional advantages of systematical rotation over mere diversification are: higher yield per acre and a still better distribution of work, allowing you to do the right thing more nearly at the right time.

It is common experience and not merely a theory that grain yields drop very rapidly if you raise grain several years in succession. Grain yields are notably good on newly broken alfalfa sod, if the grain does not lodge, or after beets.

Very few experienced successful potato growers in the Greeley district raise potatoes after potatoes. They plant potatoes on alfalfa ground broken late in the spring when the alfalfa is high enough to produce some green manure.

The full benefit of the green manure and the extensive cultivation of the potato crop is obtained if beets succeed potatoes. In this case, plowing is often dispensed with, the seed bed for the beets being prepared by double discing and leveling.

During the eight years 1910-17 our 170 delivery stations in Colorado operated during this period produced in 92 instances an average of more than 15 tons per acre. Twenty-two of these delivery stations raise a commercial acreage of potatoes. These 22 stations produced in 25 instances during these 8 years a yield of more than 15 tons per acre.

This is generally credited to the excellence of soil and water rights. No doubt this has something to do with it,

but by no means all. The yield of typical potato stations, like Lucerne and Clayton, has not fallen below 14 tons in any year since 1910. There are other stations, like Buda and Pulliam on the Great Western Railroad, also capable of producing high yields (in some years over 18 tons) but their minimum yield has been less than eleven tons.

The soil at Buda and Pulliam is capable of producing just as big yields as that at Lucerne or Clayton under favorable circumstances. But the method of handling it sometimes results in failure at the first named stations. Rotation is extensively practiced at Lucerne or Clayton and very little at Pulliam and Buda.

While there is a fair unanimity of opinion as to the lowering of yields of grain if preceded by grain or of potatoes if preceded by potatoes, there is no such consensus of opinion as far as beets are concerned. In fact, a very considerable part of the beet acreage is planted on fields with beets as the preceding crop.

When the beet business started, the main crops raised were alfalfa and grain with the addition of the potato in the comparatively small district between Eaton and Greeley. Virtually all plowing was done in the spring We all know it is almost an impossible job to produce a good seed bed for beets on alfalfa sod with spring plowing. Grain fields as existing at that time were foul with wild oats. A grain field left untouched after harvesting and plowed in the spring without previous double discing makes a good seed bed only under favorable conditions. The result was that the first beet crop on these fields was somewhat unsatisfactory. The easiest thing to do the next year was to plow the same fields.

In many cases the second crop was better than the first. Mistakes of the first year were avoided. Fields that had been in alfalfa or grain for many years received their first real plowing and cultivating and visibly became better in texture.

The impression gained ground that raising beets after

beets increased the yield and was a much easier job than to raise beets after grain or alfalfa.

As a matter of fact the impression was right that the method employed in handling grain fields produced less yields per acre than when beets followed beets.

For instance, at Longmont the yield of beets reported on all acreage where the preceding crop was ascertainable without doubt and where it was the same for the whole field was as follows:

	Tons per acre			
Year:	1908	1909	1910	1911
Beets after grain	8.8	9.0	10.9	11.0
Beets after beets	10.1	10.8	11.7	13.2

In other words, mere rotation as practiced at that time did produce lower yields than planting beets after beets.

It should, of course, be noted that the three years were not favorable years for a preparation of seed bed, the springs being unusually dry.

In fact, the years '08 and '09 were the most unfavorable beet years we have ever had in Northern Colorado. At that time we did not know as much in the way of handling the crop with a deficiency of rain and a limited supply of irrigating water as we know today.

Now as contrast to what the farmers obtained and partly still obtain when rotating beets with grain, consider our experience on the experimental farm at Longmont.

We raise there every year on some plots beets after beets without any manure, beets after beets with manure every year, and beets after wheat with manure every other year.

The average results for the six years 1912-1917 were as follows:

	Tons beets per acre	Per cent Sugar	Lbs. Sugar per acre
Beets after beets without manure	14.07	15.9	4476
Beets after beets with manure	18.10	14.2	5138
Beets after wheat with manure	17.80	15.0	5350

Beets after wheat produced a little less tons per acre, but due to the higher percentage of sugar produced 200 pounds more sugar per acre than beets after beets with manure every year. However, as the beets after wheat were manured only every other year this production was obtained by the use of half the quantity of manure used where we raised beets after beets every year.

Of course using manure increases the yield whether you rotate with wheat or not. Therefore the conclusion might be drawn that manuring is the main thing.

At any rate it is clear from our results that while on farmers' fields rotating with grain produced lower yields, on our experimental plots it produced about the same yield.

We can not say that rotating increased the yield very much, but we used only half the manure for the same production per acre.

Now Mr. Maxson, who handles these experimental fields, will admit that after all, even on our experimental farm we sometimes do not do the right thing at the right time, either because we are not able to with the equipment and time available or because we don't know what the right thing is. In other words we have just as much to learn by our mistakes, as farmers have to learn.

It is therefore possible that the next five years will show better results than the last 5 years.

If we then must say that rotating with wheat does not give higher yields to speak of, it only gives the same yields with less manure, what is the advantage of rotation in this case?

Our small plots on our experimental farm can be handled on schedule time. This is not the case with farmers fields. We realize today that one of the most serious factors affecting the yield is that beets are planted too late. They are planted too late because all of the plowing is done in the spring. Some of it is done in warm weather when the soil drys out rapidly with every operation. The consequence is that the seed germinates quickly and evenly when there is an unusual sequence of favorable show-

ers. Late planted seed has to be planted deep to get it into moist earth. A heavy rain packs the soil and forms a crust, so that the beet germs, when they finally work through the earth are rather weak.

The seed bed can be prepared quickly and to the best advantage if the field is plowed in the fall. Of course, you cannot do any fall plowing if you raise beets after beets. Therefore, if fall plowing and the subsequent early planting of beets is an advantage, you must have a crop preceding beets which allows you to plow in the fall either before or after the beet harvest.

Thus the advantage of rotating beets with grain gives you a chance to do part of the spring work in the fall and ought to give you a higher yield because the beets are planted in a more favorable time.

4. Another reason advanced for rotating crops is that if you raise the same crop on the same field for any length of time, you multiply diseases or insect pests affecting this crop. Sooner or later this is undoubtedly the case. A typical example of this is an orchard. Experience has shown that the older the orchards are and the more of them existing in the community, the more work is required in the line of spraying and other similar measures to fight insect pests. Beets, fortunately, so far in our districts have been reasonably free from such pests. One very common pest, the root louse, is just as common in beet fields on newly broken alfalfa sod as in fields where beets follow beets.

B. Rotation on the Farm

The advantages of a systematical rotation cannot be realized in one year. Sometimes immediate requirements have to be met regardless of the future. Observing farmers may have noticed that our sugar company farms did not follow in the past a system of rotation. The reason usually was that suddenly land was required for experiments on a large scale, or for raising beet seed with no other land available but our own farms.

Or, in case of farms with short haul to the factory and feed yards with plenty of manure, we figured that for the

time being the farms made more money out of raising beets than any other crop.

Quite a number of farmers are in the same position. Many tenants holding the farm only one year, taking possession in December or January, cannot possibly have any sensible rotation unless the landlords co-operate. A tenant naturally will prefer to plant beets after beets.

To get all the benefits of rotation you must practice it persistently which means raising about the same acreage of the different crops each year.

Sometimes some crops look more attractive than others, due to the ease with which they can be raised, or due to high prices. The object of farming being to make money and not to raise big crops, and the dollar today appearing much bigger than five dollars five years from now to most of us, it is natural that farmers should raise the speculative attractive crop in preference to the one best for the farming system. Farmers in the West are not as conservative as those in older farming communities, where it takes a generation to change a customary sequence of crops. That is, of course, also the reason they take quickly to good new ideas.

However, speculations sometimes go wrong and lightning seldom strikes the same place twice. Nineteen-seventeen was a year of phenomenal grain yields and high prices. It was said that the wheat farmer gave the beet farmer the merry ha-ha. This year it is different.

The beans in 1917 looked good, especially when Uncle Sam bought them after some urging at 8 cents the pound. They looked still better when big seed companies contracted for the crop at 9 and 10 cents per pound.

Now beans and peas are notoriously uncertain yielders, except in a few choice localities. That is the reason concerns handling peas and beans are always hunting for new territories. Most Colorado farmers did not know this, nor would they have believed it if told by a beet sugar man. The writer has heard from early childhood that it is not safe to put more than one-tenth of your land in a crop like peas, beans or beet seed. The bean yield

and bean prices are a disappointment to many. The beet crop has proved once more a rather safe proposition to tie to.

Our own men responsible for handling our farms, and especially John Comer, who have long farmed without any system of rotation, are now strong believers in it. Their practical experience has shown them that it is better. What appeals to these men most is that they can handle the farms on the same system each year and that the system allows them to do the proper work at the proper time.

The backbone of the system is; we break every year some alfalfa sod in the fall and re-seed an equal acreage in the spring with grain as a nurse crop. Between breaking alfalfa and re-seeding we have two beet or beet seed crops and one grain crop.

This can be arranged by planting winter wheat on the newly broken alfalfa sod, and following it with two crops of beets or beet seed. The beet seed crop is taken off so early in the season that the fields can be plowed in the fall.

If we have beets alone, they are planted in the crowned and fall plowed alfalfa sod, followed by barley or other spring grain followed by another crop of beets.

This means about a six year rotation if we let the alfalfa stand two years, a seven year rotation if we let it stand three years.

It will probably not seem wise to many farmers to keep fields only two years in alfalfa. However, the alfalfa yields in most parts of our beet districts are not what they ought to be. Instead of 3.5 to 4 tons as claimed, the average for several years is probably nearer 2.3 tons. It is believed that more frequent rotation will improve the alfalfa yields. It also will not be so difficult to make a good seed bed of newly broken alfalfa.

On a 160 acre farm, with 140 acres actually cropped and irrigated, a seven year rotation will make every year 60 acres of alfalfa, 40 acres of grain and 40 acres of beets. In potato or bean districts part of the land in beets and

grain can be planted to potatoes and beans. In notably good wheat districts the inclination will be to raise a little more grain and less beets.

To sum up:

Very practical and not merely theoretical considerations make a systematical crop rotation an advantageous system to follow.

It demands planning ahead and making up your mind this year as to what you are going to do next year.

It will allow you to do fall plowing, which is highly desirable, because it not only does away with the rush of spring work, but it enables you to prepare your seed-bed for beets as well as spring grain earlier, and to plant considerably earlier.

It should result, therefore, in better yields, and therefore better returns.

It does not prevent you from occasionally taking a gamble with some temporarily attractive crop.

Sugar beets have their attractions, too, as many grain and bean farmers will testify.

Meteorological Report

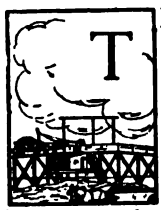
FOR OCTOBER, 1917 AND 1918

Temperatures	1918	1917
Mean Maximum	*	64.03°
Mean Minimum	44.53°	28.00°
Monthly Mean	*	46.01°
Departure from Norm.	*	—1.89°
Maximum	*	83.00° on 6th
Minimum	17.00° on 26th	—5.00° on 28th
Precipitation in Inches:		
To Date	17.25	11.85
For Month	0.42	0.91
Greatest in 24 hours	0.24 on 18th	0.13 on 17th
Departure from Norm.	—0.90	—0.47
Number of Days:		
Clear	10	13
Partly Cloudy	17	9
Cloudy	4	9

*Omitted on account of faulty maximum thermometer.

Shall we Eradicate the Narrow Leaf Cottonwood?

A. C. Maxson



THERE is a nation-wide campaign on against the common barberry because of its relation to the black or stem rust of wheat.

In order to free our wheat growing sections of this disease, which it is estimated cost the grain growers of Colorado 300,000 bushels of small grain in 1917, the State Council of Defense has passed a resolution requesting that no more of the common barberry be planted and all known to exist within the state be destroyed.

Section 6 of Colorado amended Pest law gives the State Entomologist authority to declare plants, animals and insects which are injurious to crops to be pests and order their destruction. The Council of Defense has still further resolved to support the State Entomologist in his efforts to enforce the provisions of this law.

The foregoing illustrates the importance which is being placed nowadays upon the relation of certain plants, as carriers of disease, to agricultural products.

Important as a knowledge of this relation is a knowledge of the relation existing between both wild and cultivated plants and the insects which attack certain crops. That such a relation exists between the narrow-leafed cottonwood trees and the sugar beet root louse is now an established fact.

Just as the eradication of the common barberry will reduce the losses due to stem rust, so will the eradication of the narrow-leafed cottonwood tree reduce the losses due to the beet root-louse.

From investigations carried on during the past ten years we find that the Longmont territory lost this year 1.35 tons per acre on the average. This represents a total loss of 16750.8 tons, $167,508 or $204.50 per grower.

The cutting of all narrow-leafed cottonwood trees within the Longmont territory will not prevent all this loss as

there are many of these trees in our canons and foot hills from which the beet root-lice are carried by westerly winds to our beet fields.

From surveys made during the last three years, we find that one-half of the Longmont territory lies within one mile of narrow-leafed cottonwood trees.

This one-half of the territory had root-louse infestation of over 11 per cent greater this year than the half more than a mile from such trees. This means that the difference in yield of beets from the two halves was 840 lbs. per acre in favor of that half more than one mile from the narrow-leafed cottonwoods.

Since there were 12408 acres of beets harvested in the Longmont territory this year one half of this, or 6204 acres lost 840 lbs. per acre because of their nearness to these trees. This represents a loss of 2605.68 tons or $26,056.80. This amount divided among the growers in this portion of the territory would increase their returns by $64.44 on an average. The grower raising 20 acres would be richer by $84.00 were there no narrow-leafed cottonwood trees closer to his field than one mile.

With the exception of along the rivers, the narrow-leafed cottonwood trees are scattered a few in a place over the Longmont territory. In fact all of them could be cut without affecting the appearance of any farmer's premises. Why not then, when cutting trees, as many of us do every year, cut out the narrow-leafed and leave the broad leafed cottonwoods? The latter are just as hardy, grow to be larger and do not harbor, so far as known, any disease or insect which injures our crops.

When planting trees let us plant the broad-leafed cottonwoods if we want cottonwoods at all.

If all farmers and landlords in the beet growing area of Colorado would cut all narrow-leafed cottonwoods, our beet crops would be better and our farms no worse off.

The losses given in this article are the smallest which have occurred for at least three years. In 1916, for example, the losses were nearly three times as great, as the root-louse was nearly three times as abundant as last summer.

Facts About Beet Pullers

T. A. Smith

EVER since beets have been grown in the United States for commercial purposes, all the leading agricultural implement manufacturers have been trying to perfect a beet puller that would meet all soil conditions. But to take a trip through our beet growing districts and see the many beets that have been left by the pullers and the rough condition of the ground we can only say that the progress made has been very unsatisfactory.

The old two-point walking puller of ten years ago made by the Moline Plow company did a better job than any two-point puller made today. Too many beet growers today,when they go to the implement dealer for a beet puller, make a good inspection of the seat and the seat spring and if they meet with his approval, the other mechanism is of small importance.

In looking over J. F. Jarell's article, "Cleaning Up the Beet Crop" in last month's "Through the Leaves," we can readily see how a few beets left in the ground will soon mean a loss of a ton per acre. If to use a puller (even though it be a walker) that will pull all of the beets, you are getting well paid for the tired feeling when night comes.

The baby puller made in Denver is very unsatisfactory except in the sandy sections. I am within the limits in saying that more beets are left in the field, or are cut off by this puller than by any other make. Invariably, when I ride through the country and see beets left sticking around through a field, and make inquiries as to the make of beet puller used, it is a baby.

The John Deere sulky puller has been very unsatisfactory in former years, but the writer saw one of this year's make in use this fall doing work in every way satisfactory.

The side puller (I don't mean a subsoiler) called the Canton Clipper, made in Canton, Ohio, in use nearly ex-

clusively in Ohio and Southern Michigan is the best puller for all conditions that I have ever seen. It leaves the beets in the row where pulled; leaves the ground in such condition that a team can draw more beets; breaks a very small per cent and in a harvest when we have a little freeze every night and more beets are pulled than are piled, the beets are not exposed as they are when pulled with a two-point puller. Another great advantage, one team is sufficient for a puller when only one point is drawn through the ground instead of two. Again you will say "Is it a sulky?" but sorry to say, it is not.

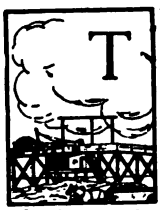
It is the intention of the Sugar Company to have a few of these pullers tried out on the company farm here next fall.

Just remember next fall when you go to buy your puller that there are more makes that don"t give satisfaction than there are that do.

D. L. Cooper with beets grown in his territory

Heating the Water for Farm Animals

George Knutson



THE plant and animal kingdom can live longer without food than they can without water. Why, then, should we not pay more attention to this most important item of caring for the farm animals?

First of all, we should have a good supply of clean, fresh water which is easy of access to the animals. The most important thing is that the water in the winter, especially for animals that are not housed, is heated to the point that the body heat will bring the water up to body temperature with the least possible loss of nutrients, after being drunk. It is cheaper to heat the water outside of the animal than after it is in them. If the water is not heated in the winter, and the stock drink any considerable quantity of it, they stand around with their backs humped up and their hair on end, fighting the cold that has entered their body.

Nature has provided shivering for the animal kingdom. This is used only when oxidation and combustion are not rapid enough to maintain the normal temperature of the body. The cold water taken in causes sudden changes in temperature and gives rise to the shivering to protect the animal. Every move that an animal makes takes energy, and food is energy. Shivering takes energy to overcome it. Fats are the most concentrated form of energy, and fat is the thing in most of our cattle feeding operations that we are trying to put on the animal.

Why then, use these fats (energy) to overcome the loss of body temperature by making the animals drink cold water? We all know the price of feeding stuffs. We also agree that the energy that we have put into a horse in the form of feed to do a certain piece of work costs more than would a chunk of coal containing the same number of heat units, or amount of energy.

Would it not be well then, to get a tank heater to heat

this water for the animals? This would cut down the amount of food consumed and increase the efficiency of the foods that are designed to build up the animals.

Satisfactory heaters can be had for approximately $20.

It takes about 10 to 15 cents per day to operate a heater for a herd of 150 steers.

Backbone or Wishbone

J. F. Jarrell

A STORY is told of a society lady who seemed to feel the need of having some surgical operation performed upon her person in order to be in style. She often heard her friends say that some event happened either just before or just after the operation. Not having had an operation of any kind performed she felt out of place and began to consider her physical perfection as a severe handicap in her social life. Consequently she decided to have an operation of some sort so she would be able to hold her place in elite society. The surgeon after a careful examination told her that he thought she was physically perfect and there was no use of being operated upon. She informed the surgeon that she knew well enough what she wanted and to lay aside his scruples and operate upon her. The surgeon seeing that the lady was determined to be in style called his attendants and proceeded with the operation. Upon regaining consciousness the lady was very anxious to learn if the operation had been successful, if she were apt to recover and what the nature of the operation was. The surgeon told her that the operation was entirely successful and that she would soon recover. The lady impatiently asked, "But doctor, what did you do to me?" The doctor replied "As I said before, I thought you were physically perfect, but upon a closer examination I found that you were not. I found that instead of a backbone you had a wishbone so I took out the wishbone and put in a backbone." She took the hint.

We hear men say, "I wish I had manured that piece of ground so the yield would have been more," "I wish I had gotten ready for that rise in the market so I could have grabbed some easy coin." I wish it would not freeze up early this year." "I wish I had my work done so I could take a good rest." "I wish I could make a fortune this year so I could retire." I wish Jones would sell me his farm for less than it is worth so I could make people think I am a good trader." "I wish that note would not come due so soon so I could buy a new car." I wish the war was over, no the war is over; wish it wasn't."

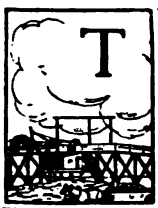
Do you suppose men of this type will ever realize that they need an operation? They ought to for they are not stylish and every man wants to be in style. If any of us find a man of this type, let's advise him to call on "Dr. Sawbones" and have the same operation performed that the lady had when the doctor threw out her wishbone and put in a backbone.

These days of reconstruction will call for men with backbone even more than the days of war have. The fellow who cusses everybody, except himself, is only cussing himself, as others see it. The man who is on the fence trying to be a neutral is advertising the fact that he is a "jackass." The man who is guessing and gambling on a bonanza crop of some kind is pipe dreaming. The man who wants to corner the spud crop is silly and the one who puts all his energies into any one crop is daft. A good strong backbone of rotation is what the wise farmer will tie to and stay with until he can retire with the satisfaction of knowing that he has earned the respect of his fellow men and the remaining years of peace which is his due.

Beets, wheat, alfalfa, cattle and hogs are the chords which seem to harmonize in the tune of reconstruction. Try it over and see how it sounds. Beets, wheat, alfalfa, cattle and hogs. Does it seem to ring true? Does it sound any better than the monotone, "Wheat, wheat, wheat, wheat; spuds, spuds, spuds, spuds? Think it over! Which seems to be the best for permanent agriculture?

The "Flu"

A. C. Maxson



HE present epidemic of Spanish influenza reminds the writer of the winter of 1892 and 1893 which was noted for the great number of cases of la grippe, as it was called then, and also an accompanying epidemic among horses.

The winter in question the writer spent on a large ranch in North Dakota where he helped care for 150 head of horses and 50 head of mules. What we then called distemper broke out among the horses during December and in the course of the winter, about 75 per cent of them had this disease. The mules appeared to be practically exempt.

This disease was accompanied by a rise in temperature, swelling under the jaws, and constipation, also a discharge from the nose.

It was thought at the time that the disease was transmitted principally through this nasal discharge. For this reason, sick animals were watered and fed in vessels never used in watering or feeding healthy ones. The swelling under the jaws often gathered and broke. Before the breaking of this swelling occurred, the animals had great difficulty in breathing and some died from strangulation.

It seems that this disease of horses follows as a natural result of epidemics of grippe. Europe was visited by an epidemic during the winter of 1892 and 1893 and many horses became diseased also.

In talking with a veterinarian not long since, it developed that Colorado had an epidemic among horses similar to that in North Dakota. It is barely possible that the disease can be transmitted from men to horses and vice versa.

Horsepower Per Acre

IOWA employs 7.2 horses for 92 acres of cropped land and northern Colorado 5.4 for 91 acres. The intertilled acreage is bigger in Iowa and the hay acreage in Colorado. The acreage of small grain is 28 acres for 136 acres of cropped land in Colorado and 156 acres in Iowa; in neither case does it equal the intertilled acreage. Only occasionally can the condition of land be bettered by plowing for small grain after intertilled crops, and, with the exception of fall plowing, it is hard to find where the tractor is to find a place. In Colorado it requires horsepower at the rate of 8.8 horses per 100 acres to work farms from 20 to 39 acres, 6.3 horses for 80 to 99 acres and 4.7 from 140 to 179 acres. Let us consider the figure 6.3 horses for 99 acres. A slight increase in the power of the teams or the addition of a brood mare will bring us level or overhorse us comfortably but not extravagantly. There will be three teams for haying, two three-horse plow teams, and as big a team as we can possibly need for tough sod or alfalfa plowing. For 140 to 170 acres, figuring in the same way, only 4.4 horses would be required---a very substanial economy, but machinery and help have to be largely increased. Important as power is it is not the only point. If the farm is but 40 to 59 acres, 3.1 horses would be required at the rate of 7.2 horses per 100 acres for that size of farm---an insufficient number for haying and the heaviest plowing.

On a farm in which I am slightly interested in northern Colorado, the seeding was already done and the plow team of five was plowing leisurely for potatoes when the tractor salesman came along. After some conversation the lad who works the farm was invited to buy a tractor. He asked what he should do with it if he had it. The salesman studied a while and said, "Plow more acres." but the farmer said he had power to burn, when it came to

plowing and that his plowing would be finished a month ahead for potatoes and was already done for beets; that he could only occasionally fall-plow without irrigation on account of the nature of the soil, and that when it was right he had plenty of horsepower; in fact, if it were not for haying he could do with four horses instead of six, and that he tried to break even by developing a couple of three-year-olds. The salesman was a good one; he wasted no more time, and departed, to find someone who was underhorsed or expansive and would buy a tractor.

In many districts with land adapted to fall plowing the tractor can be used to advantage for the next ninety days, but since we have had rain the horses, having completed grain harvest and tillage, can turn a lot of soil before beet and potato lifting. I met the salesman later. He said that apart from dry farming, it was a hard place to sell tractors. He asked me my position and I said, "Neutral." I did not see where I could push a tractor into a properly rotated farm, as mere traction, though every farm should have power for silage cutting, grinding, and so forth, here as in other countries.

Ninety-one acres cropped of northern Colorado farms are cropped as follows: Grain 28, intertilled 21, hay (alfalfa to cut three or four times) 29, miscellaneous 3, which may include cabbage, onions, or other garden crops. This is not a big farm, but it will keep a man extremely busy where beets and potatoes are in large proportion, but just where the tractor is to horn in except for fall plowing, it is difficult to see. There are but 34 acres to plow, and that is the least thing, whilst divisible power is a necessity from the time careful work begins in spring cultivation until the teams are doubling out of the field with potatoes and beets in the fall.

It seems much the same case as one expensive car and two or three flivvers. Probably the expensive car is the best, but it is one and indivisible. Where we must have several units of power the flivvers seem indispensible. When united, our units are capable of any traction feat that the tractor can accomplish that we need on mod-

erate sized farms, and they can operate in any weather or soil condition that admits of culture. Where plowing is the peak load, the case will be entirely different, but a good farmer seldom allows his plowing to exceed his intertillage. For the present, the auxiliary engine that takes the sting out of reaping and binding and the extreme load from the potato digger, that grinds and chaffs, saving valuable food and energy seems more needed than increased traction, to which the horse and mule are so much more thoroughly adapted than the rotary power of the tractors, so far on exhibition, for the use of small farmers, who are, after all, the bulk of our best agriculturists.

---"Breeders Gazette, Oct. 24, 1918.

Permanent Agriculture

Kurt Grunwald
Farmer and Third Vice President International Irrigation Congress

ECONOMIC independence makes a nation inherently strong and it is a large and important essential in the waging of a successful war.

Under date of October 22, 1917, Mr. Herbert Hoover, head of the United States Food Administration, made the following appeal to the American farmers:

"One of the most vital problems confronting the nation is that of procuring sufficient sugar to meet the requirements of our people and of the allied nations fighting our common battle. The production of cane sugar in this hemisphere can and will be increased to a limited degree. But we must rely upon the farmers in sugar-beet producing sections of the country for a part of the needed supply. I therefore earnestly appeal to every farmer so situated to come to his country's aid in this hour of need. With-

out the cooperation of the American beet grower, our task will be very difficult and our ability to respond to the calls to be made upon us for this very essential commodity will be curtailed. It is at least the duty of every beet grower to maintain in 1918 his normal acreage of sugar beets. It is his privilege to increase that acreage to the extent that a well-balanced production of crops will permit and in this manner effectively demonstrate his patriotism."

On the surface, this appeal to the average farmer of the United States does not convey all that it really comprehends and, if I may be bold enough to state, the man who sent it forth, in all probability, did not fully realize all that was involved in his appeal.

In asking the farmers to grow sugar beets he is asking them to also take the first and most essential step in the practice of permanent agriculture. The great essential of any nation is an abundant and reliable supply of food; this is absolutely essential to a permanent government.

Permanent agriculture is very old; it has been practiced for thousands of years by good agriculturists of all ages.

In the Georgical Essays (edition of 1777), by Dr. A. Hunter, which also includes many essays of reports by other "philosophical farmers," we find the following interesting statements:

The ancient writers gave us excellent comments upon the husbandry of their times. Hesiod wrote very early upon agriculture. Mago, the Carthaginian general, composed 28 books upon the same subject, which were translated by order of the Roman senate. Upon these models Virgil formed his elegant precepts of husbandry.

Cato the censor wrote a volume upon agriculture. Columells has left us 12 books upon rural matters. Varro's treatise will ever be esteemed.

The celebrated Sully calls agriculture one of the breasts from which the state must draw its nourishment. The

great man could not possibly have given us a more happy simile.

Collber entertained a different notion of policy. Esteeming manufacturers and commerce as the sinews of the State, he gave all possible encouragement to the artisan and the merchant, but forgot that the manufacturer must eat his bread at a moderate price.

The farmer being discouraged, the necessaries of life become dear; the public graneries become ill stored; manufacturers languished; Commerce drooped; a numerous army soon consumed the scanty harvest; and in a short time industry fell a sacrifice to the ill-judged policy of the minister.

From that period to the present the French nation have constantly been availing themselves of their mistake. Under the genial influence of the King, societies are erected in every province. Men of the first distinction do not disdain the cultivation of their own lands. M. de Chateuvieux and Duhamel are the greatest ornaments of their country.

The art of husbandry boasts an origin coeval with the human race. Its age, however, seems to have contributed but little toward its advancement, being at present extended but a few degrees beyond its primitive institution. Until the philosopher condescends, to direct the plow, husbandry must remain in a torpid state.

War has been declared; commissions have been appointed; meatless and wheatless days proclaimed; we are told to eat more of some foods and less of others; to economize in sugar, etc. Why all this? It is in order that we may have that with which to feed our allies in this war, because food is to win the war. Napoleon's statement that, "An army can not travel on an empty stomach," is as true now as it was in his time.

With us the food situation has not yet reached a really acute stage. The pressure for conservation of food will be much greater with the prolongation of the war. It is true we have been and still are a very wasteful nation, not alone in foodstuffs that we raise but just as much also

in that imported from other lands. The war has changed the situation so we can not import much from foreign countries, because with some we are at war, and although others would like to send to us, all the ships are needed for transportation of troops and their supplies, as well as foodstuffs for the armies and civil population of our allies.

From a purely democratic and free-trade point of view it is all right to trade our corn for sugar, chemcials and potash from foreign countries, our meat and other finished products for foodstuffs of other nations, but from a sound national economic point of view it is wrong, as this big war of nations is teaching us. Since the beginning of this war we have been realizing this more and more clearly, and also the necessity for our becoming more economically independent of other nations. It means that we must raise and manufacture for ourselves more of those things for which we are now depending on other nations. It is dawning upon us gradually that the strength of a nation is from within and not from without. From this point of view, our entrance into the war may prove a blessing for us and future generations.

As has been said, the evolution of European industry has been looked upon as a great phenomenon, very much as we view the mysteries of chemistry. In both cases the prerequisites have been and are definiteness of purpose, application of and a profound respect for knowledge and, for the success of the former, system and organization sustained by a general national policy. That is the point---a policy.

The controlling minds of Europe began many years ago to work upon a scientific basis in the development of permanent agriculture, and the world marveled.

It is not putting it too strong to state that the sugar beet has made possible the economic success of many European nations.

Europe readily recognized its broad economic value; that its benefits were not confined to the mere value of

the sugar and by-products but also to the influence that beet culture had on the increased fertility of the soil in its production of subsequent crops. The culture of sugar beets has increased the yield of small grain per acre in one European nation from 9 and 13 to 28 and 30 bushels per acre. The average in this country is about 15 bushels per acre. Emigration ceased under these improved agricultural conditions. A complete economic transformation was taking place. Leading European agriculturists agree that these remarkable yields have been brought about through the rotation of cereal crops, alfalfa and clover. sugar beets, and other root crops.

I think it was Humphrey who first defined the principles of "permanent agriculture" as a way to "use the land without abusing it."

Prof. Cyril G. Hopkins, perhaps the foremost authority on the subject in America, puts it this way:

"It is the first business of every farmer to reduce the fertility of the soil by removing the largest crops of which the soil is capable, but ultimate failure for the landowner unless provision is made for restoring and maintaining productiveness. Every landowner should adopt for his land a system of farming that is permanent—a system under which the land becomes better rather than poorer."

At the risk of being considered more venturesome than wise, I am going to go these two eminent gentlemen one better. I submit that the principles of "permanent agriculture" applied today throughout the United States will double the yield per acre of cereals—the average yield, of course—and will enable the American farmer not only to maintain this mark but eventually to surpass it, not for one year, but for every year.

I ask you to consider just what this statement means. If today an Edison or a Burbank should announce that he had discovered a means whereby each acre in the United States which is devoted to cereal crops could be made to yield two bushels where it now yields but one, regardless of any reasonable expense involved, he would be hailed as the world's greatest benefactor. The value

of the telephone, the electric light, sinks into insignificance when compared to that of a discovery which enables a country to feed double the number of people from the same amount of land.

I do not have to tell you that the basis of this "permanent agriculture" is soil fertilization and crop rotation. I do not intend to go into the various systems of crop rotation. There are many that have been long since proved. Different systems suit different conditions. To attempt to deal with them in the time allotted to me would be useless. But what I want to say is this, that no matter what system of crop rotation you decide on, you will find that the introduction of a hoed root crop in the rotation of one year in four is an absolute prerequisite to heavy yields of cereal crops; first, because of the direct advantages that accrue to the land itself from the growing of such a crop; second, because of the indirect advantages that come from the material increase in the barnyard manure to put on the land when the root crop is fed to stock. At first this may not seem clear. Let me illustrate.

There was a Hebrew peddler who, by dint of industry and persistence, attained the dignity of a horse and wagon. This entailed responsibilities, such as the establishment of a commissary department for the horse, and so he entered into negotiations with the keeper of the livery stable in the small New England town where he made his headquarters---and let me tell you that negotiations of this character between a Hebrew peddler and a Yankee liveryman are some negotiations. When the smoke cleared away Jake accepted the fact that $12 a month was rock-bottom. He had one more shot in his gun, however. "Vell," he said, "if I give twelf dollars, how much you allow me for the manure, eh?" I'll tell ye, Jake," he answered, "at $12 there ain't going to be no manure."

A good many farmers entertain much the same idea about their farm that Jake did about his horse. They recognize the value of manure, but they provide no means for getting it.

As stated before, a root crop is essential; it means an abundance of food for stock. More food means more stock and more stock means more manure. More manure means more soil fertility. More fertility means more crops. Once you've got the idea, you can keep going as long as you please. I've got to stop here.

Now, don't jump at the conclusion that I mean the growing of a root crop alone solely to provide food for live stock and for the direct advantage to the soil. It pays, even at that, but it doesn't have to be done. For more than a hundred years, turnips, a crop of practically no monetary value, which is fed almost entirely to stock, have been the basis of agriculture in England. English farmers now grow 2,000,000 acres of turnips in rotation with 6,500,000 acres of cereal crops. A century of actual practice has convinced them that this system is responsible for their heavy yields per acre in cereals.

Now, the Englishman is proverbially slow to change any method that is working well. To exchange the good for the better is not one of his characteristics. So the British farmer is still growing turnips. The American farmer will not be content with a good root crop; he wants a better root crop.

Agriculturists in continental Europe were not slow to see the results England was getting from her turnip rotation after Thaer, the agriculturist started the system in the early eighteen hundreds. They tried to get their farmers to adopt the system but they were up against a stone wall. "Turnips is turnips." They had no market value; they had to be fed, not sold; they were less profitable than the crops already being grown. (I have a mental picture of myself right now trying to get the farmers in the irrigated West to grow turnips.)

Fostering our sugar beet industry simply to the point where we can supply our own demand for sugar would bring the sugar beet acreage in this country to approximately 2,000,000 acres. About 700,000 acres of sugar

beets were harvested in 1917. By utilizing our potato crop as Europe does, we should be able to put not less than 10,000,000 acres in potatoes each year. Twelve million acres of hoed root crops in rotation with cereals in the proportion of one year in four would mean nearly 50,000,000 acres of land in this country on a firmly established basis of permanent agriculture with an increase in cereal production of twice the present yield per acre.

This is a pretty good goal to be aiming at, but it can only be attained by a proper and consistently followed-up system of permanent agriculture. We are all familiar with the appeals from Washington for increased food productiveness, especially sugar and wheat, in order that we may supply our allies needs as well as our own. France, which formerly produced her own supply of sugar, now has her fields and factories in the hands of her enemy, and England, which produced turnips instead of sugar beets and imported her sugar from elsewhere, both find their supplies of sugar largely cut off, and have to turn to us to help them out. This we can do to a greater extent if our farmers and manufacturers will cooperate as they should.

We of the West, where through the scientific application of water, a desert has been transformed into a garden, where soil and climatic conditions are most favorable to the raising of sugar beets, and where at present about 80 per cent of beet sugar factories are located with room for more, must put our shoulders to the wheel, must help Mr. Hoover in his work. Mr. Hoover's point of view is strictly that of a military necessity; our compliance, however, not only will meet the present stress, but is building for national independence and self-dependence, and by cooperative efforts will help to establish a system of permanent agriculture, which means more and better sugar beets, potatoes, corn, wheat, rye, oats, barley, and alfalfa, and we will surely be victorious in this righteous war for which we have enlisted.

---From "Reclamation Record," October, 1918.

Representative Live Stock Sales at Denver Yards

This table is based on representative sales as reported by the "Record Stockman." It is intended to show the trend of prices for the thirty day period preceding the day we go to press.

FEEDERS

	$8.00 to $9.45	$9.50 to $9.95	$10.00 to $10.45	$10.50 to $10.95	$11.00 to $11.45	$11.50 to $12.50
800 to 899 lbs.						
Oct. 26-Nov. 10	244	160	407	299	214	76
Nov. 11-Nov. 26	869	406	615	403	574	199
900 to 999 lbs.						
Oct. 26-Nov. 10	381	63	315	725	439	330
Nov. 11-Nov. 26	176	198	397	254	923	446
1000 to 1099 lbs.						
Oct. 26-Nov. 10	3	36	1	1002	44	126
Nov. 11-Nov. 26	291	4	0	0	34	30

LAMBS

	$13.00 to $13.45	$13.50 to $13.95	$14.00 to $14.45	$14.50 to $14.95	$15.00 to $15.45	$15.50 to $15.95
50 to 59 lbs.						
Oct. 26-Nov. 10	190	652	5927	4675	53	0
Nov. 11-Nov. 26	0	233	5414	3655	1334	0
60 to 69 lbs.						
Oct. 26-Nov. 10	302	0	815	426	864	1459
Nov. 11-Nov. 26	0	402	831	3879	0	0

LAMBS—FREIGHT PAID TO RIVER

	$13.00 to $13.45	$13.50 to $13.95	$14.00 to $14.45	$14.50 to $14.95	$15.00 to $15.45	$15.50 to $15.95
50 to 59 lbs.						
Oct. 26-Nov. 10	3040	2044	2825	1384	0	0
Nov. 11-Nov. 26	0	0	8564	1267	1171	958
60 to 69 lbs.						
Oct. 26-Nov. 10	0	0	0	482	632	0
Nov. 11-Nov. 26	0	0	2476	2120	0	0

"Feeders" sold at a slight advance over last month. Light weights predominated, bringing around $10.75 for 850-pound feeders and 25 cents more for 950. Few sales of feeders weighing over 1000 pounds

"Lamb" market was from 50 cents to 75 cents higher than last month, depending on the weight. Killers bought heavy at $14.50 to $14.75. Those going to the feed lots (mostly Freight Paid to River) sold around $14.25 for 50-60 pounds while heavier lambs brought a quarter more.

"Ewes" sold around $7.00 f. o. b. Denver.

Making the Machinery Last Through

NLESS we make the best possible use of the present stock of farm machinery, our food production cannot be maintained to the present scale. We have very generally noted the decrease in available man power, due to the demands of war and the inducements of industry, and we have proceeded as if this were the only factor in production likely to break down.

But man power is not the only limiting element in food production. Of equal significance, in America, at least, are horse power and farm machinery. To sustain production we must maintain the usual supply of plows, harrows, cultivators, seeders, mowers, rakes, hay loaders, binders, wagons, threshers, silage cutters, harness and, above all, repairs. There is no present prospect of shortage in horses, but there is imminent danger that the supply of farm machinery may prove inadequate before the war is over.

In the past, farm machinery has been so cheap and so plentiful that it was often better in every way to buy a new implement than to stop in a busy time to repair an old one; certainly better than to wait for new parts to be shipped from the factory. In this way many a valuable piece of farm machinery has been temporarily replaced only to be permanently left to rot and rust while its successor inherited the work.

In many cases the discarded machine, a self-binder, perhaps, was perfectly good except for an insignificant part worth but a few cents; indeed, it was not usually the cost of repair that furnished the original occasion for buying new, but simply a wish to avoid delay in the work. After the new machine was on hand it was easier to use it than to repair the old, and in most cases one machine at a time is enough. So we have fallen, naturally if not inevitably, into wasteful ways so far as farm machinery is concerned.

It has been estimated by the trade that the full life of

the self-binder is only about three years. Now, it is a pretty fair sized farm that uses a binder more than ten days each season in the actual cutting of grain. That means thirty days of total service. But thirty days of use against nine hundred of idleness do not spell efficiency for a machine that never cost less than one hundred and twenty dollars and is now costing two hundred or more, nor do thirty days of service justify the expenditure. Nobody would build a shed costing a hundred dollars if it would last but thirty days or a barn at twelve hundred to last a year; yet we pay out money freely for machinery that is equally short-lived.

The time has now come when it is not only costly to replace worn-out machinery, but it is even doubtful if it can be replaced to the extent necessary to maintain production unless our old-time methods be radically reformed.

During the fall and early winter the entire outfit of farm machinery should have complete overhauling and extra parts should be ordered early. It is not enough that the machine "worked to the end of the season." That is no guaranty of its serviceability for the next season.

The one-hoss shay went to pieces all at once because it had no weakest spot, but, unlike that celebrated vehicle, every machine does have a weakest part and however well it behaved the past summer, there is no assurance that it will go through another year unless it is thoroughly overhauled, the weakest spot found and fixed, and the tool as a whole put in first class working order. If this is done, it will be fairly certain that the machine will serve at least one season more. Indeed, a great many sudden breakdowns are preventable when this policy is followed.

By such a systematic overhauling it will frequently be found that one good machine can be made out of two old ones, or, what is more likely, that both may be restored by repairs that may yet be ordered. When it is not possible to order the missing parts, it is still true that in many cases the blacksmith can forge them out. It was done that way in the good old days and it can be done again.

Neighbors, by working together and by searching the back lots, the fence corners and the junk piles, can even dig up much useful machinery out of the discard. This is a patriotic duty because the available manufacturing energy of the country that can be devoted to farm machinery, ought to be turned to the manufacture of tractors and tractor plows. of broader harrows and larger disks than heretofore for four and six horse teams, and of such other new and heavy machinery as may be especially useful for quantity production, particularly of the smaller grains. This energy ought not to be consumed in the manufacture of material that can be saved, either by overhauling or by the best of care.

It is not enough to repair a machine that has actually broken down. Even while still working it requires systematic overhauling. Burrs that are rusting on should be removed and oiled. Bolts that have worked loose should be tightened, but not until the bearing has been cleaned and oiled. Joints involving wood should be soaked in oil or painted. Edged tools should be carefully, not wastefully ground, and when the day of service comes, the farmer may well revise the old adage of an "ounce of oil is worth a gallon of vinegar." It applies to farm machinery as well as to human dispositions.

While a machine is in use during the summer, every farmer should make notes on a shipping tag of the points needing attention, and this tag should be attached to the machine when it is put away at the end of the season. It matters nothing how well it may be working during the year. There is always something that should be overhauled, and if the time cannot be found during the busy season, the tag will serve as a reminder.

"Make the machine last through" should be a slogan now and although it should not be adhered to at the expense of good farming, a little careful attention will prolong the life of most machinery by a year or two, and in some cases even more.

The Country Gentleman seeks to point out that what may be good business under one set of conditions may

be wasteful, suicidal, and even unpatriotic under other conditions. Those other conditions are now upon us, and the farmer, when he understands them, will do his share as he has done it in every other phase of production.

The individual farmer is hardly in a position to realize what seriously changed conditions the war has brought about concerning everything made of steel. Hence, the greater need to point them out in a somewhat wholesale way.

Neither is the general public in a position to realize how slender is the thread that sometimes sustains production. For example, in so small a matter as plow points the new conditions have made themselves felt this fall. In many sections of the country, stricken by drought, the ground was so dry and hard that a point would be worn out in a single day. In this way the points were used up faster than they could be furnished by the trade. The result has been a substantial reduction in the wheat acreage that was planned.

Few farmers and fewer laymen would connect a dry summer with a shortage of plow points and a reduced wheat acreage, yet such a summer is the first sign of a coming shortage in steel, in labor which is available for civilian manufacture, and in transportation.

It is well to heed these first warnings, because food production in America, even more than in any other country, depends upon a full supply of farm machinery, and that in turn is conditioned upon the care with which we make the most of what we now have on hand.

—From "The Country Gentleman," Nov. 9, 1918.

NOTICE

Shippers and owners of cattle, horses and mules are hereby notified that on and after December 1, 1918, the brand inspection fees will be five cents per head instead of three cents as heretofore.

STATE BOARD OF STOCK INSPECTORS,
By E. McCrillis, Secretary.